Honeywell

# MS2421 / MS2422 / MS2431

Bar Code Scanner

## Installation and User's Guide

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# Introduction

## Manual Scope

This guide provides information on the installation, setup and operation of the MS2421, MS2422, and MS2431 scanner only models. If the MS2421or MS2431 scanner has been integrated with a scale, please refer to the Scale Addendum for detailed instructions on the appropriate cable connections, communication specifications and calibration procedures required by the scale manufacturer and local Weights and Measures Authorities.

Product manuals are also available for download in Adobe® Acrobat® file format at www.honeywellaidc.com.

## Product Overview

MS2421, MS2422 and MS2431 scanner models are designed to meet the demanding needs of high volume supermarket and point-of-sale applications. With advanced features like 5-sided, 360° scanning, 5400 scans per second, a comprehensive scan zone and advanced decoding software, this high performance series of in-counter scanner/scale ready products guarantees fast customer checkouts with minimal operator fatigue and stress. The MS2421, MS2422, and MS2431 scanners are equipped with a multitude of standard features including:

- Stratos**SCAN** – 5-sided, 360° scanning that minimizes product orientation
- Stratos**SPHERE** – Decoding software that reads poor quality and damaged bar codes
- Stratos**SYNC** – Horizontal and vertical scanning zones operate independently from one another
- GS1 DataBar Decoding – Decodes GS1 DataBar, GS1 DataBar Limited, and GS1 DataBar Expanded symbologies
- Flash ROM – Upgrade latest software enhancements on site
- Powered Aux Port – Connect hand-held scanner for large or bulky items
- Scale Ready Model – The MS2421/MS2431 model is designed for custom scale integration
- Loud Speaker – 3 volume/7 tone settings can be heard in all environments
- Easy Configuration – Windows® based utility or simple bar code setup
- Fully Automatic – “No touch” wake up from power save modes
- EAS Deactivation – Electronic Article Surveillance (EAS) included
- Field Replaceable Vertical Window – Quickly remove vertical window for cleaning or replacement
- Stratos**SCOPE** – Visual diagnostic indicator for easy to read feedback on scanner condition
- Stratos**SWAP** – Modular optics engine technology – small, pre-aligned, field replaceable modules
- Stratos**SCHOOL** – Operator training software

## *Base Kit Components*

| Part # | Description | | |
|---|---|---|---|
| MS24xy-105Nz | Bar Code Scanner | | |
| | x | 2 | MS2420 |
| | | 3 | MS2430; 508 mm (20.0") |
| | y | 1 | Scanner Only, Scale Ready – Compact |
| | | 2 | Scanner Only – Sub-Compact |
| | z | D | Diamonex Horizontal Window |
| | | S | Sapphire Horizontal Window |
| 00-02407 | MetroSelect™ Configuration Guide | | |
| 00-02034 | MS2xxx Stratos™ Series Configuration Addendum | | |
| 00-05311 | MS2421 / MS2422 / MS2431 Bar Code Scanner Installation and User's Guide | | |

*Guides also available for download at www.honeywellaidc.com.*

*Other items may be ordered for the specific protocol being used. To order additional items, contact the dealer, distributor or call the customer service department.*

## *Optional Accessories*

| Part # | Description |
|---|---|
| 57-57210x-N-3 | RS232 Interface Cable, Straight Cord with Short Strain Relief |
| 57-57212x-N-3 | RS485◈ Port 9 Cable, Straight Cord |
| 57-57201x-N-3 | USB Full Speed Communication Cable, Straight Cord, Type A (Non-Locking) Connector |
| 57-57227x-N-3 | USB Full Speed Communication Cable, Straight Cord, Locking 12V Plus-Power™ Type A |
| 57-57008x-N-3 | Aux Program Cable, Straight Cord with Short Strain Relief |
| 57-57099x-3 | LSO RS232 PowerLink AUX Cable with built in power jack, Straight Cord |
| 57-57099x-3-12 | RS232 AUX, Straight Cord, 3.7 m (12') (for 95xx, 5145 and 7580 scanners) |
| CBL-420-300-C00 | RS232 AUX, Coiled Cord (for 1200, 1300 and 1900 Series scanners) |
| 52-52511x | EAS cable, 24" |
| 52-52556x | EAS cable, 6' |

◈*Applicable for IBM® Host applications.*

## *Optional Accessories*

| Part # | Description |
|---|---|
| AC to DC Power Transformer - Regulated<br>Output: +5.2V @ 4A<br>+12V @ 1.5A | |
| 70-74868 | 120V United States and Canada |
| 70-74882 | 220V – 240V Continental European |
| 70-74880 | 220V – 240V United Kingdom |
| 70-74884 | 220V – 240V China |
| 70-74886 | 220V – 240V Australia |
| 70-74888 | 220V – 240V India |

## *Replacement Parts*

| Part # | Description |
|---|---|
| ⚠<br>Caution | Window types (Diamonex and Sapphire) are not interchangeable due to laser safety and/or scanner performance differences.<br><br>To change window type, the scanner must be returned to the manufacturer for reconfiguration. |
| 46-00233 | Diamonex Platter – Compact |
| 46-00296 | Diamonex Platter – Compact with Platter Lift Handle |
| 46-00234 | Diamonex Platter – Sub-Compact Size |
| 46-01087 | Diamonex Platter – 508 mm |
| 46-00235 | Sapphire Platter – Compact |
| 46-00297 | Sapphire Platter – Compact with Platter Lift Handle |
| 46-00236 | Sapphire Platter – Sub-Compact Size |
| 46-01086 | Sapphire Platter – 508 mm |

*Other items may be ordered for the specific protocol being used. To order additional items, contact the dealer, distributor or call the customer service department.*

## *General Precautions*

The following are some general precautions to remember when handling the MS2421/MS2422/MS2431 scanner.

**Do not turn** the unit upside down with the platter in place.

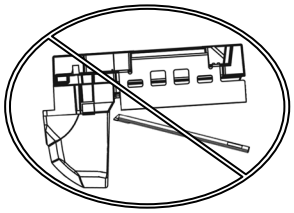


*Figure 1*

**Do not press** on the window in the platter or the vertical window frame.

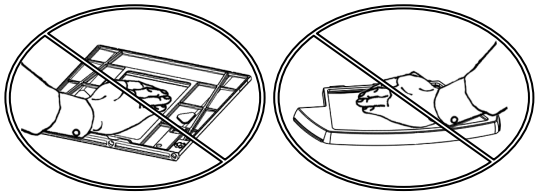


*Figure 2*

**Platter Removal**

No hardware or tools are required to remove the platter (see Figure 3). Refer to the Maintenance section of this manual for additional information on platter replacement.

*Note: See caution statement on page 3.*

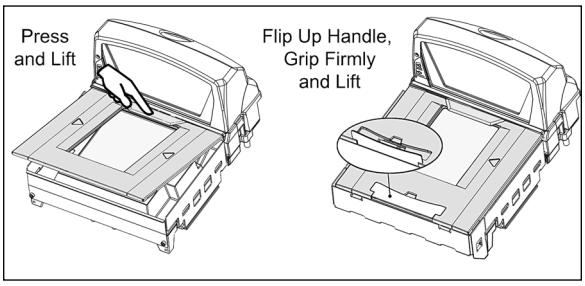



*Figure 3*

**Finger Recesses**

There are two finger recess areas provided to assist when lifting the scanner. Rest both thumbs against the vertical window frame for added stability when lifting the unit by the finger recesses.

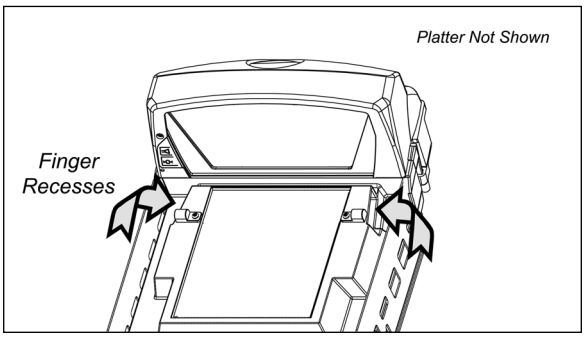



*Figure 4*

# Design Specifications

## Operational

| | | |
|---|---|---|
| Light Source: | VLD 650 nm | |
| Peak Laser Power: | <1.5 mW | |
| Embedded Laser: | Max Optical Power: | 10 mW |
| | Wavelength: | 650 nm |
| Horizontal Depth of Field: | 0 mm - 100 mm (0"- 4") for 0.33 mm (13 mil) Bar Code | |
| Vertical Depth of Field: | 0 mm - 216 mm (0"- 8.5") for 0.33 mm (13 mil) Bar Code | |
| Scan Speed: | 5400 Scan Lines per Second | |
| No. of Scan Lines: | 54 (38 Horizontal / 16 Vertical) | |
| Motor Speed: | 6000 / 6000 RPM (Horizontal / Vertical) | |
| Min Bar Width: | 0.114 mm (4.5 mil) | |
| Scan Zone: | 360° | |
| Decode Capability: | All Standard 1-D Bar Codes, GS1 DataBar, GS1 DataBar - Expanded, and GS1 DataBar Limited Bar Codes | |
| System Interfaces: | RS232, Aux RS232, RS485, and USB | |
| Print Contrast: | 35% Minimum Reflectance Difference | |
| No. Characters Read: | Up to 80 data characters. Maximum number will vary based on symbology and density. | |
| Beeper Operation: | 7 Tones or No Beep; 3 Volume Settings | |
| Indicators (LED): | Blue | Laser ON, Ready to Scan |
| | Blue Flash | Good Read, Decoding |

## Mechanical

| | Length | Width | Tower Height |
|---|---|---|---|
| MS2421 L x W x H: | 399 mm (15.7") | 292 mm (11.5") | 130 mm (5.12") |
| MS2422 L x W x H: | 353 mm (13.9") | 292 mm (11.5") | 130 mm (5.12") |
| MS2431 L x W x H: | 508 mm (20.0") | 292 mm (11.5") | 130 mm (5.12") |
| Depth (Below Counter): | 100 mm (3.9"), All Models | | |
| Weight (with Platter): | MS2421: | 7.20 kg (16 lbs.) | |
| | MS2422: | 6.80 kg (15 lbs.) | |
| | MS2431: | 8.20 kg (18 lbs.) | |

*Specifications are subject to change without notice.*

## *Electrical*

| | | |
|---|---|---|
| Voltage Supply: | 4A @ +5V / 0.8A @ +12V | |
| Power: | Operating: | 11.9 Watts |
| | Standby: | 3.25 Watts |
| Current: | Operating: | 1.7A @ 5.2V / 0.2A @ 12V |
| | Standby: | 0.6A @ 5.2V / 0.07A @ 12V |
| Current Limits on Integrated Scale and/or Scale Display: | Do not exceed maximum current of 12V @ 0.7A / 5V @ 0.2A | |
| DC Transformers: | Class I; 5.2VDC @ 4A; 12VDC @ 1.5A | |
| *For Regulatory Compliance Information, refer to pages 55 - 57.* | | |

## *Environmental*

| | |
|---|---|
| Operating Temperature: | 0°C to 40°C (32°F to 104°F) |
| IP Rating: | IP 55 |
| Light Levels: | 4842 Lux (450 footcandles) |
| Storage Temperature: | -40°C to 60°C (-40°F to 140°F) |
| Humidity: | 5% to 95% Relative Humidity, Non-Condensing |
| Contaminants: | Sealed to resist airborne particulate contaminants. |
| Ventilation: | None Required |

*Specifications are subject to change without notice.*

# Base Model Characteristics

## MS2421/MS2431 Components

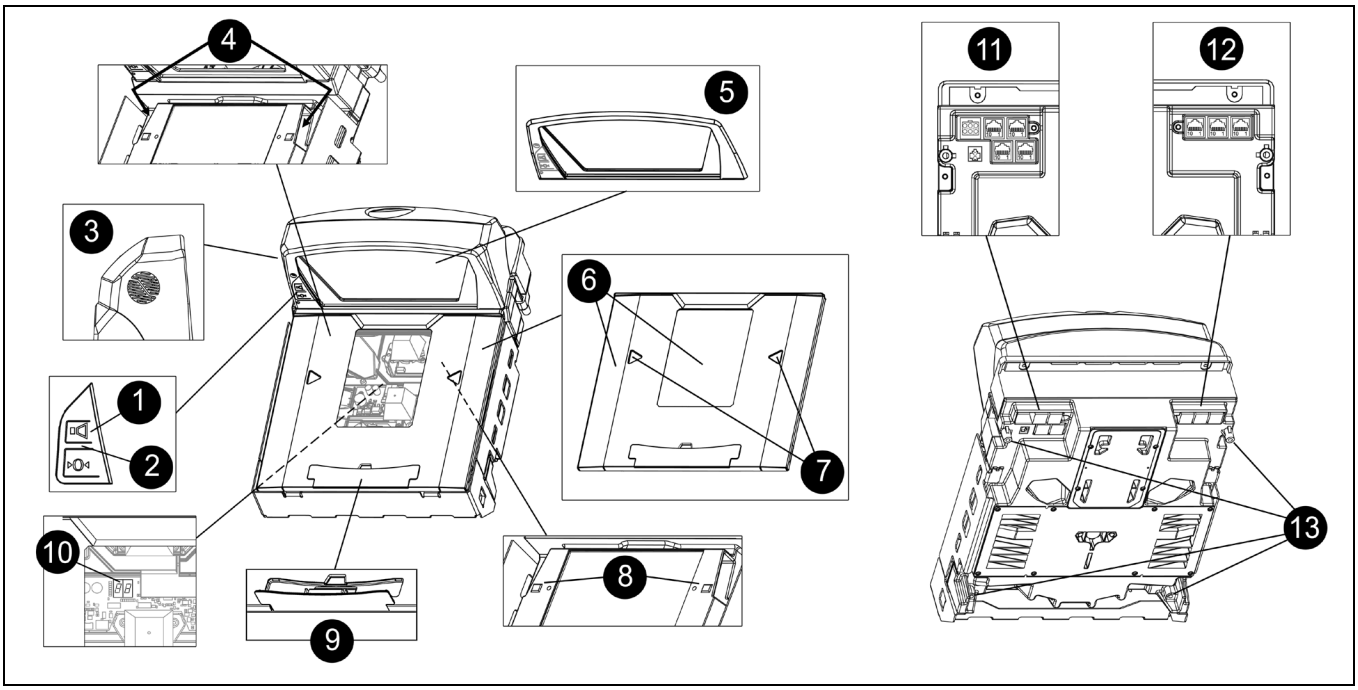



*Figure 5. MS2421/MS2431 Components (MS2421 Shown.)*

| Item No. | Description of Item |
|---|---|
| 1 | Volume/Tone Multi-Function Button *(see page 42)* |
| 2 | Blue LED Indicators *(see page 36)* |
| 3 | Speaker |
| 4 | Finger Recesses for Lifting |
| 5 | High Impact Window Frame / Vertical Window *(Laser Aperture)* |
| 6 | Replaceable Stainless Steel Platter with Diamonex or Sapphire Horizontal Window *(Laser Aperture)* |
| 7 | Flow Direction Indicators |
| 8 | Platter Support Bumpers *(see page 45)* |
| 9 | Optional Product Weight Flip Up Bar / Platter Lift Handle *(Option provided with scale ready MS2421-105x or MS2431-105x models only.)* |
| 10 | Diagnostic Indicator Display *(see page 38 for Error Codes)* |
| 11 | DC Power, Scale, and EAS Connectors *(see page 9)* |
| 12 | System Interface Connection Area *(see page 9)* |
| 13 | Optional Leveling Feet *(Option provided with scale ready MS2421-105x/MS2431-105x models only.)* |
| *Note: Scanner label information can be found on page 10.* | |

## *MS2421 Scanner Dimensions*

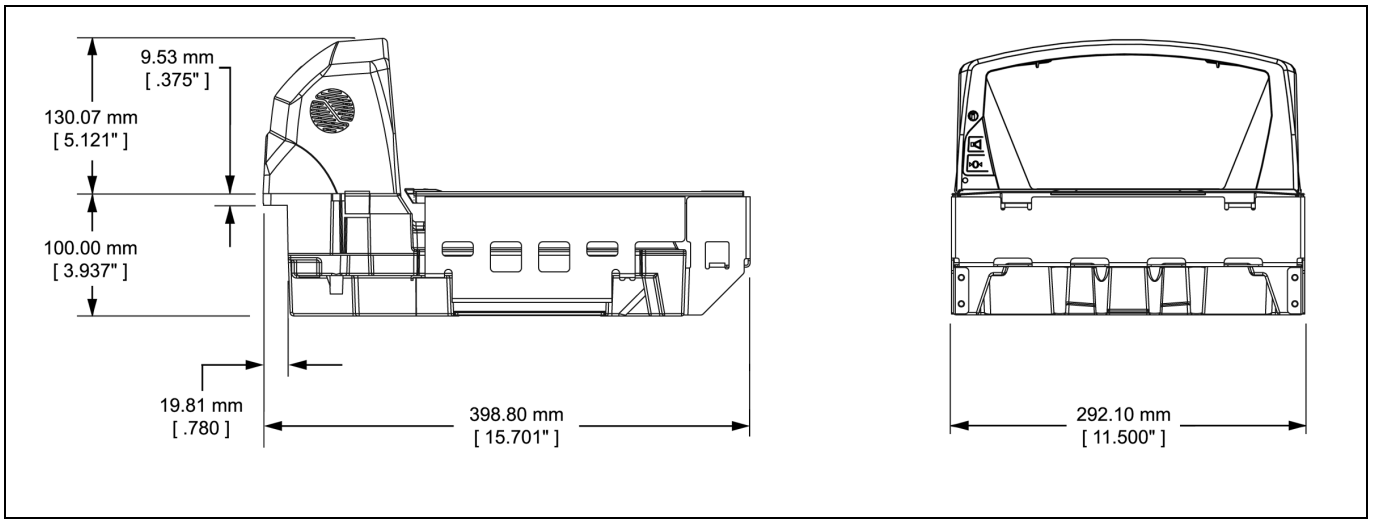



*Figure 6. MS2421 Dimensions*

## *MS2431 Scanner Dimensions*

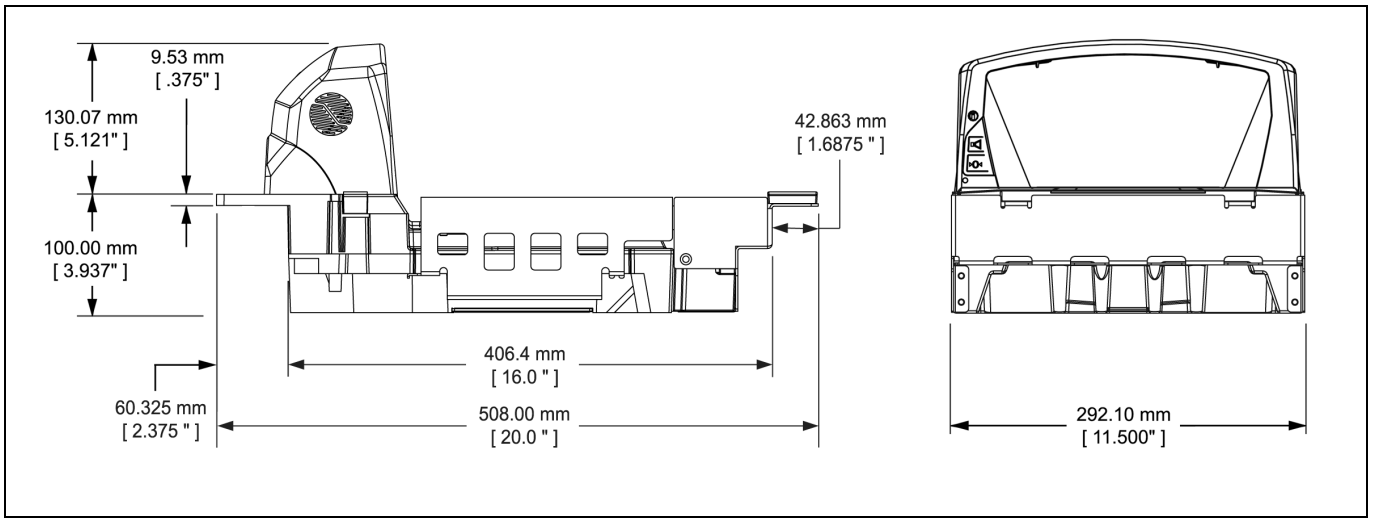



*Figure 7. MS2431 Dimensions*

## *MS2421/MS2431Connector Panel*

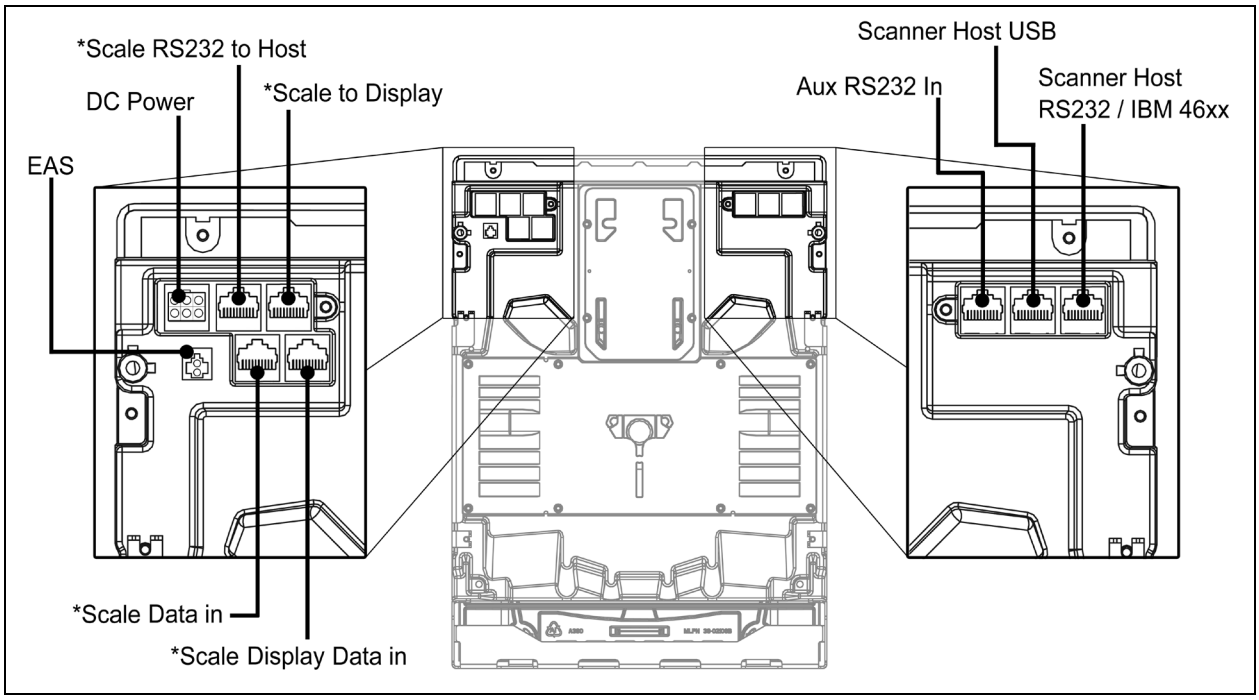



*Figure 8. MS2421/MS2431 Connector Panel*

** Scale ready MS2421/MS2431 models supply additional connectors for scale and display communication cabling. The use of these connections is dependent on the specific manufacturer of the scale being integrated. Please refer to the custom Scale Installation Guide for detailed instructions on the appropriate cable hookups and calibration procedures for local Weights and Measures authorities.*

*Specifications are subject to change without notice.*

## *MS2421/MS2431 Caution and Serial Number Labels*

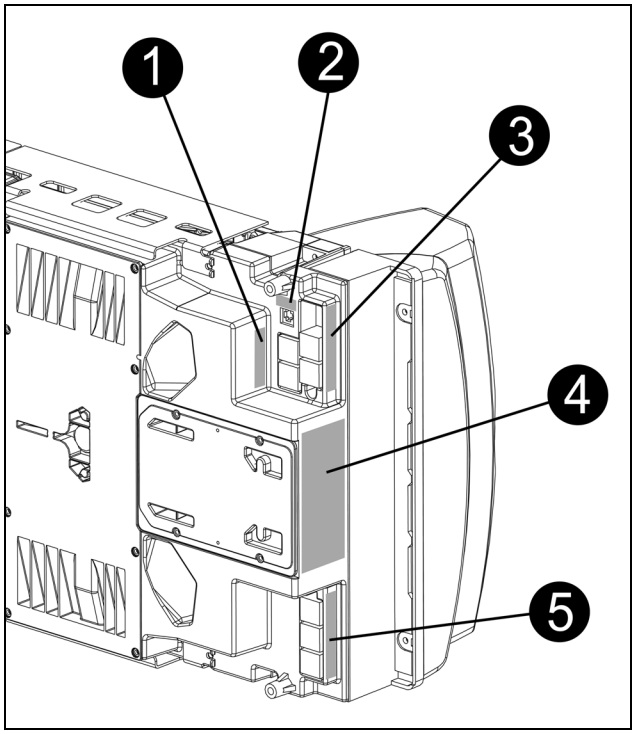
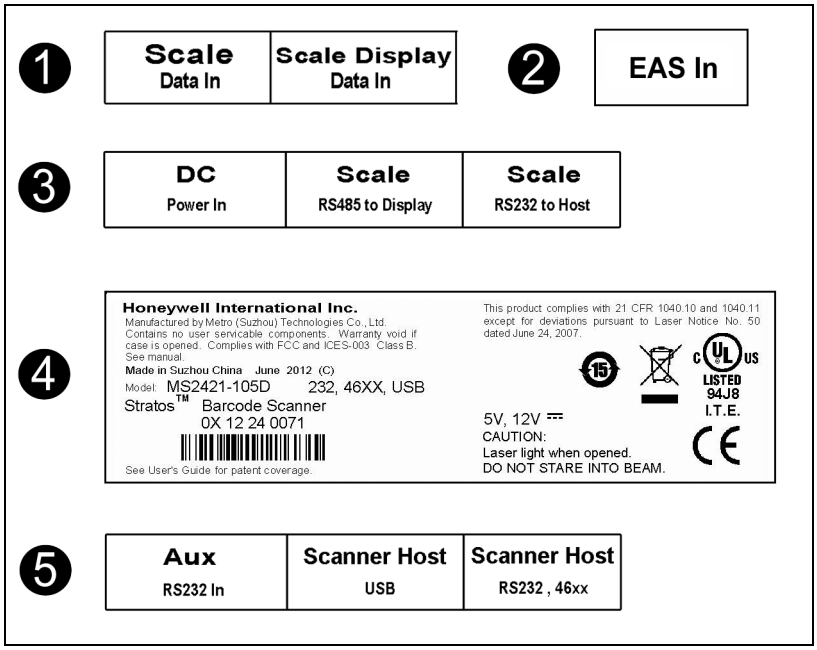



*Figure 9. MS2421/MS2431 Label Locations (Top) and Examples (Bottom)*




| | |
|---|---|
| **Caution:** ⚠ | To maintain compliance with applicable standards, all circuits connected to the imager must meet the requirements for SELV (Safety Extra Low Voltage) according to EN/IEC 60950-1.<br>To maintain compliance with standard CSA C22.2 No. 60950-1/UL 60950-1 and norm EN/IEC 60950-1, the power source should meet applicable performance requirements for a limited power source. |

## *MS2422 Components*

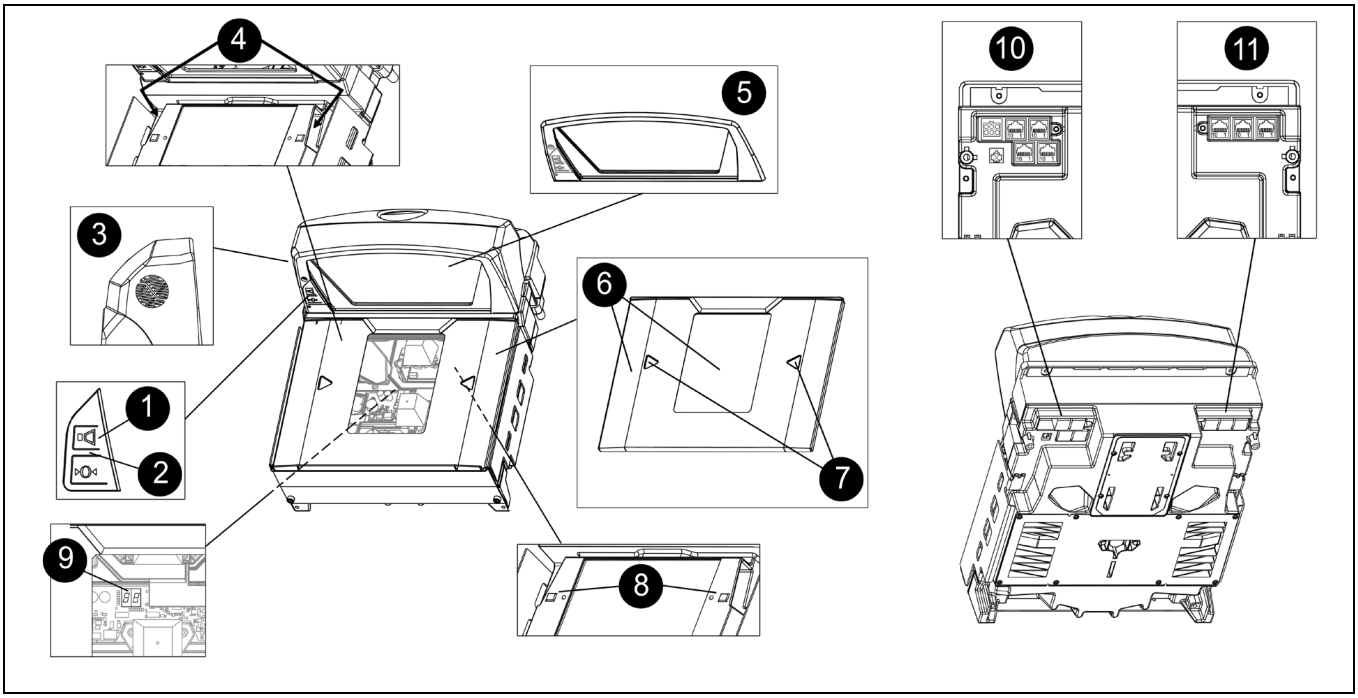



*Figure 10. MS2422 Components*

| Item No. | Description of Item |
|---|---|
| 1 | Volume/Tone Multi-Function Button *(see page 42)* |
| 2 | Blue LED Indicators *(see page 36)* |
| 3 | Speaker *(see page 35)* |
| 4 | Finger Recesses for Lifting *(Located Under Platter)* |
| 5 | High Impact Window Frame / Vertical Window *(Laser Aperture)* |
| 6 | Replaceable Stainless Steel Platter with Diamonex or Sapphire Horizontal Window *(Laser Aperture)* |
| 7 | Flow Direction Indicator |
| 8 | Platter Support Bumpers *(see page 45)* |
| 9 | Diagnostic Indicator Display *(see page 38)* |
| 10 | DC Power, Scale, and EAS Connectors *(see page 12)* |
| 11 | System Interface Connection Area *(see page 12)* |
| *Note: Scanner label information can be found on page 13.* | |

## *MS2422 Dimensions*

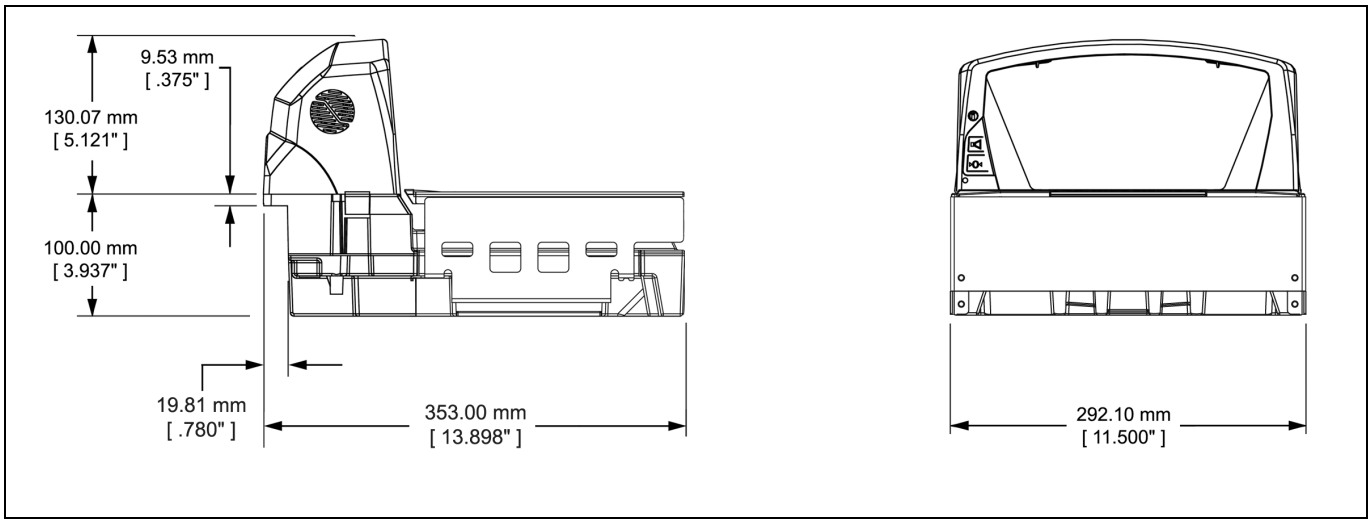



*Figure 11. MS2422 Dimensions*

## *MS2422 Connector Panel*

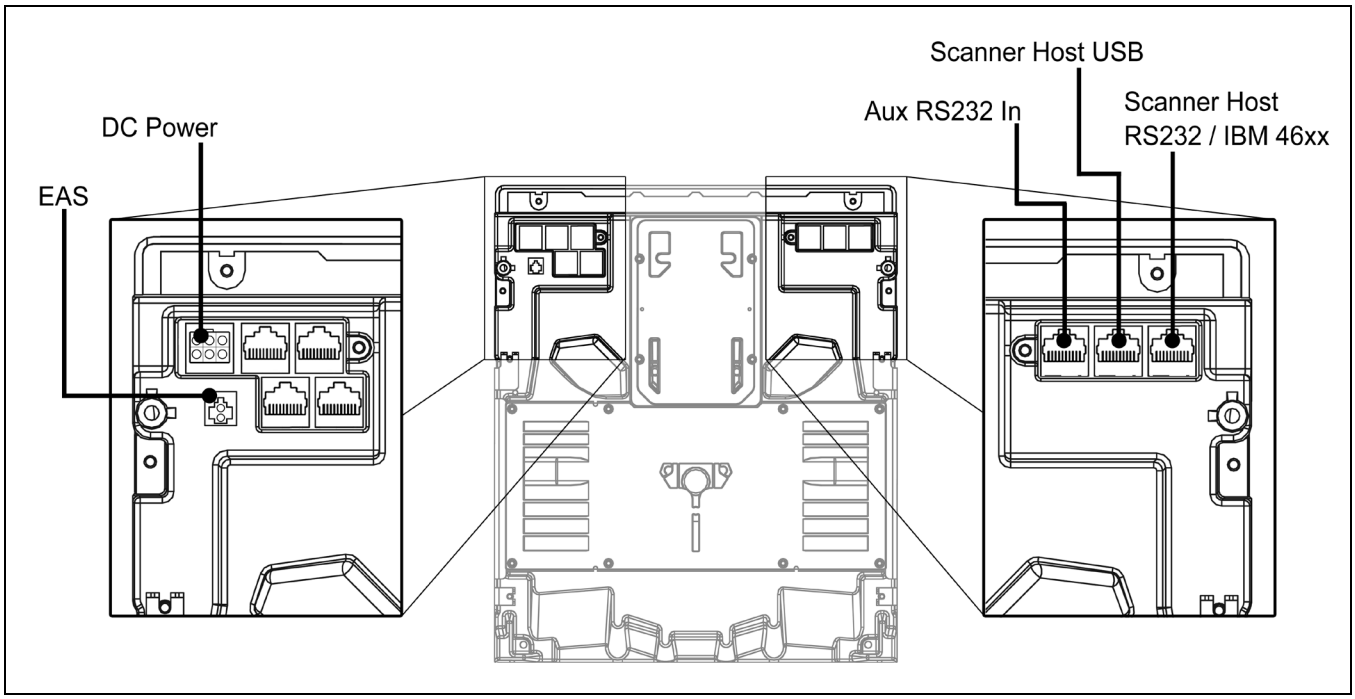



*Figure 12. MS2422 Connectors*

*Specifications are subject to change without notice.*

## *MS2422 Caution and Serial Number Labels*

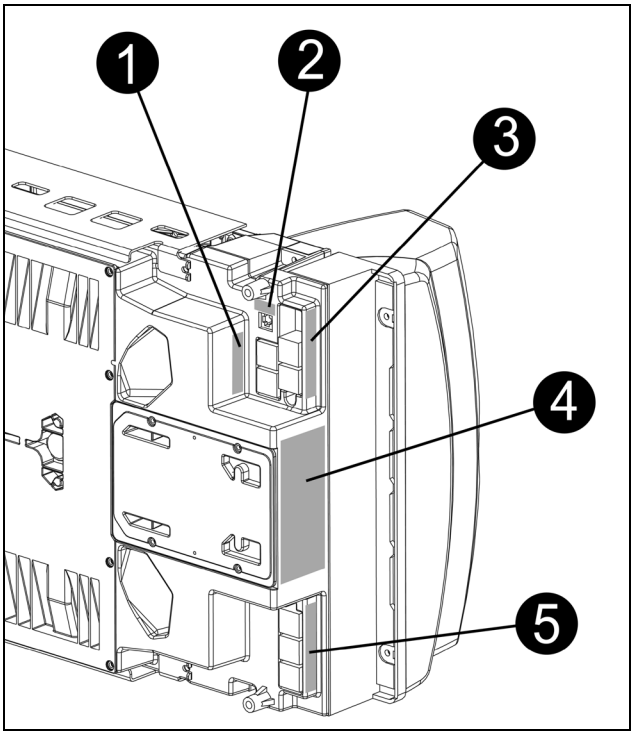
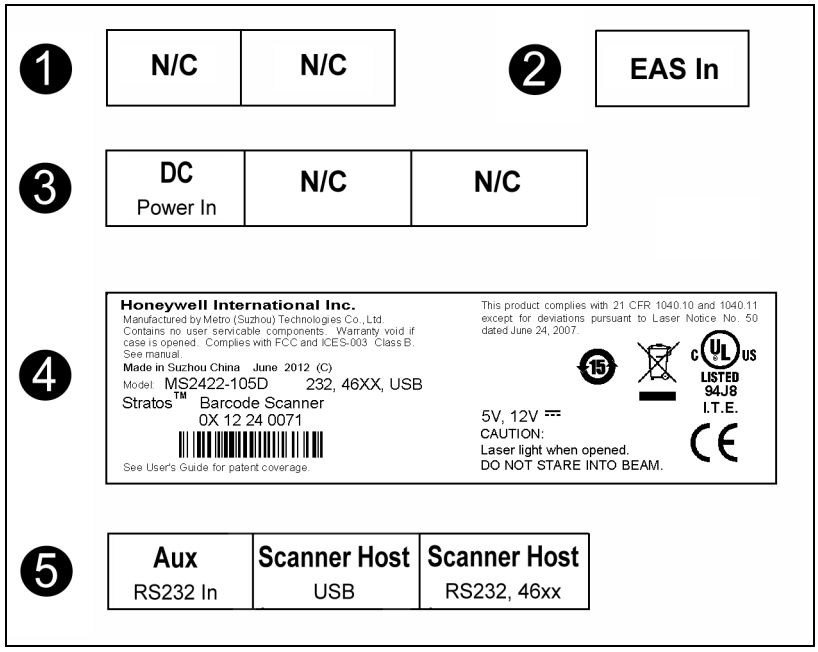



*Figure 13. MS2422 Label Locations (Top) and Examples (Bottom)*




| | |
|---|---|
| **Caution:** ⚠ | To maintain compliance with applicable standards, all circuits connected to the imager must meet the requirements for SELV (Safety Extra Low Voltage) according to EN/IEC 60950-1.<br>To maintain compliance with standard CSA C22.2 No. 60950-1/UL 60950-1 and norm EN/IEC 60950-1, the power source should meet applicable performance requirements for a limited power source. |

# Installation

## Quick Installation Outline

The following is a quick preview of the steps required for first time installations. Each item is discussed in detail later in this section.

- Determine clearance, ventilation, and service access requirements.
- Determine checkout counter layout taking into account package flow, cable routing, and power requirements.
- Choose the mounting option which provides the best cable/power access and unit stability.
- Unpack the unit.
- Make the appropriate countertop cutouts and install all support brackets.
- Place the unit in the counter.
- Install the platter.
- Follow the steps under the correct interface to connect the cables and power supply.
- Configure the unit for the correct interface.

## Site Requirements

Before installing your MS2421/MS2422/MS2431 bar code scanner, please consider the following items.

### Vertical Clearance

A minimum clearance height of 5.25" from the checkout counter surface is needed for the vertical 'hood' on all of the scanner models.

### Ventilation and Spacing

The MS2421/MS2422/MS2431 models have a die-cast housing to dissipate heat allowing the unit to operate without a ventilation fan. The temperature surrounding the unit is recommended not to exceed 40°C (104°F). There should be adequate convection and minimal heat producing equipment in close proximity of the unit. A cooling fan with a filter is recommended if there will be a conveyor motor or other heat producing equipment close to the unit that will create a high temperature environment.

### Service Access

When routing and installing the cable(s) and power supply, make sure you leave access so that these components may be swapped easily without the need to remove the unit from the checkout counter.

When changing the Stratos**SWAP** optics engine modules, removing the unit completely from the checkout counter is recommended.

## *Site Requirements*

### *Power Installation*

The Power Supply (AC/DC) should be connected to an AC Outlet that is free of electrical noise (clean). A qualified electrician can determine the amount of electrical noise on the AC line. See additional information on power installation and restrictions under the *Installation: Interface* section of this manual.

*Note: Using a switched AC outlet is recommended. The switch should be located on the operator's side of the checkout counter in close proximity to the scanner to facilitate service of the unit.*

### *Checkout Counter Layout Considerations*

When placing a scanner in a checkout counter, the following factors should be considered:

- Items should flow at a distance to the operator that maximizes comfort. The operator should not need to stretch or strain to reach for and scan packages.
- The MS2421/MS2422/MS2431 can scan a bar code on five sides of a package. The packages should flow into the scan area that provides the maximum reading performance. No lifting or orientation of the items is necessary. A properly placed item diverter can maximize the flow of packages.
- In what direction are the packages flowing? Most checkout counters are designed for left-handed takeaway. If the operator is facing the vertical window of the scanner, packages flow from the operator's right to left. The packages are in queue on the conveyor to the right and the bagging is to the left.

## *Unpacking the Unit*

1. Make sure the shipping box is topside up before opening.

2. Remove the accessories box and check the box's content for the following items.
   - Product Manuals
   - Power Supply
   - Communication Cables
   - Remote Scale Display (Optional)

3. Carefully remove the platter and store it in a safe location until the unit is properly installed into the checkout counter.

4. Lift the scanner out of the box by carefully grasping both sides near the center of the unit and lifting directly up. Refer to Figure 15 for hand placement.

   ***Important!*** ***Do not*** *remove the scanner from the box by grabbing the shipping foam. This can result in the unit falling!*

5. Carefully remove the shipping foam from around the scanner.

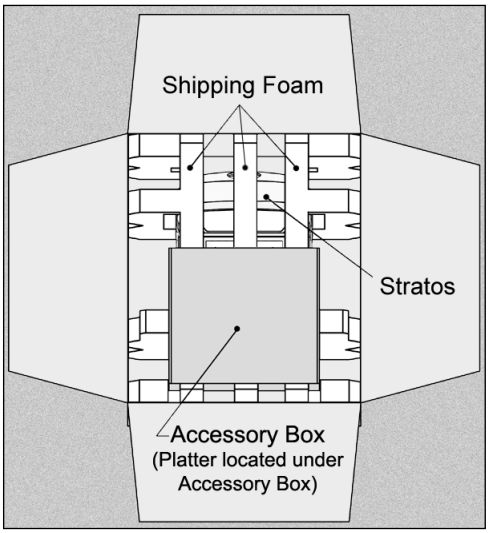



*Figure 14*

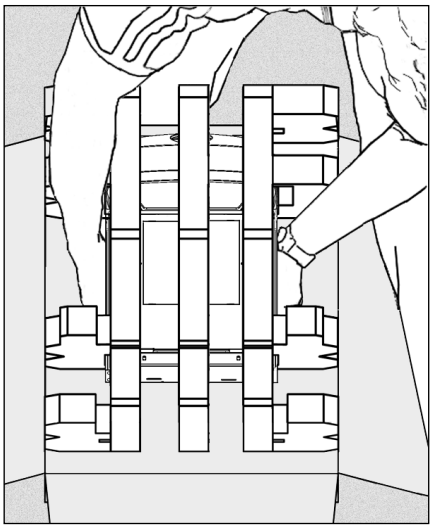


*Figure 15*

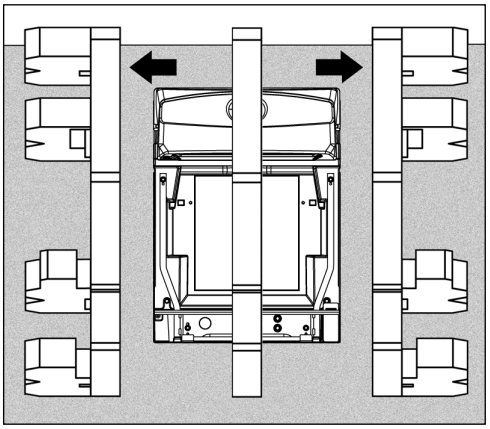


*Figure 16*

## *Installing the Unit in the Counter*

### *MS2421 Mounting Diagram*

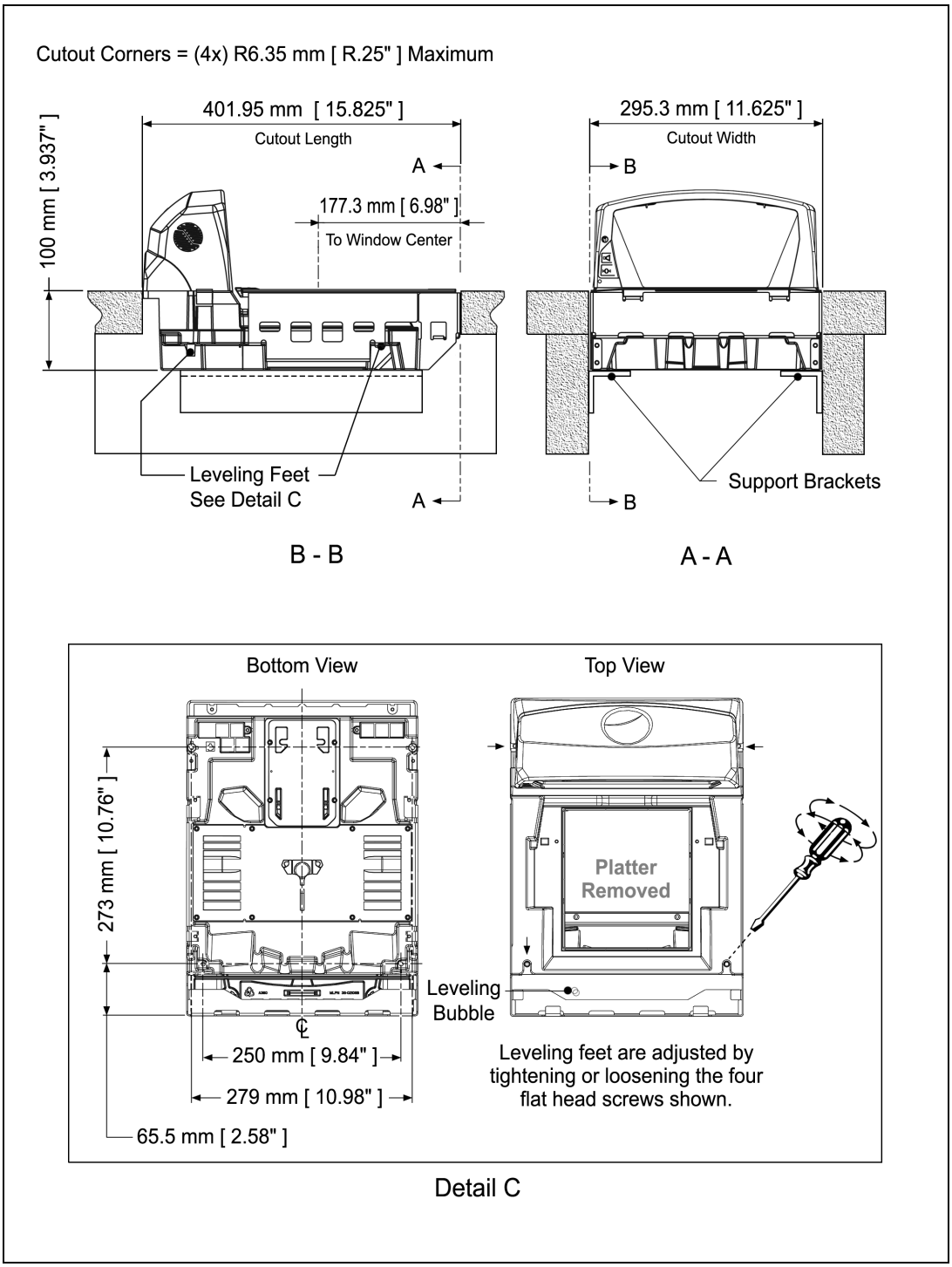



*Figure 17. MS2421 Mounting Diagram*

*Specifications are subject to change without notice.*

# *Installing the Unit in the Counter*

## *MS2422 Mounting Diagram*

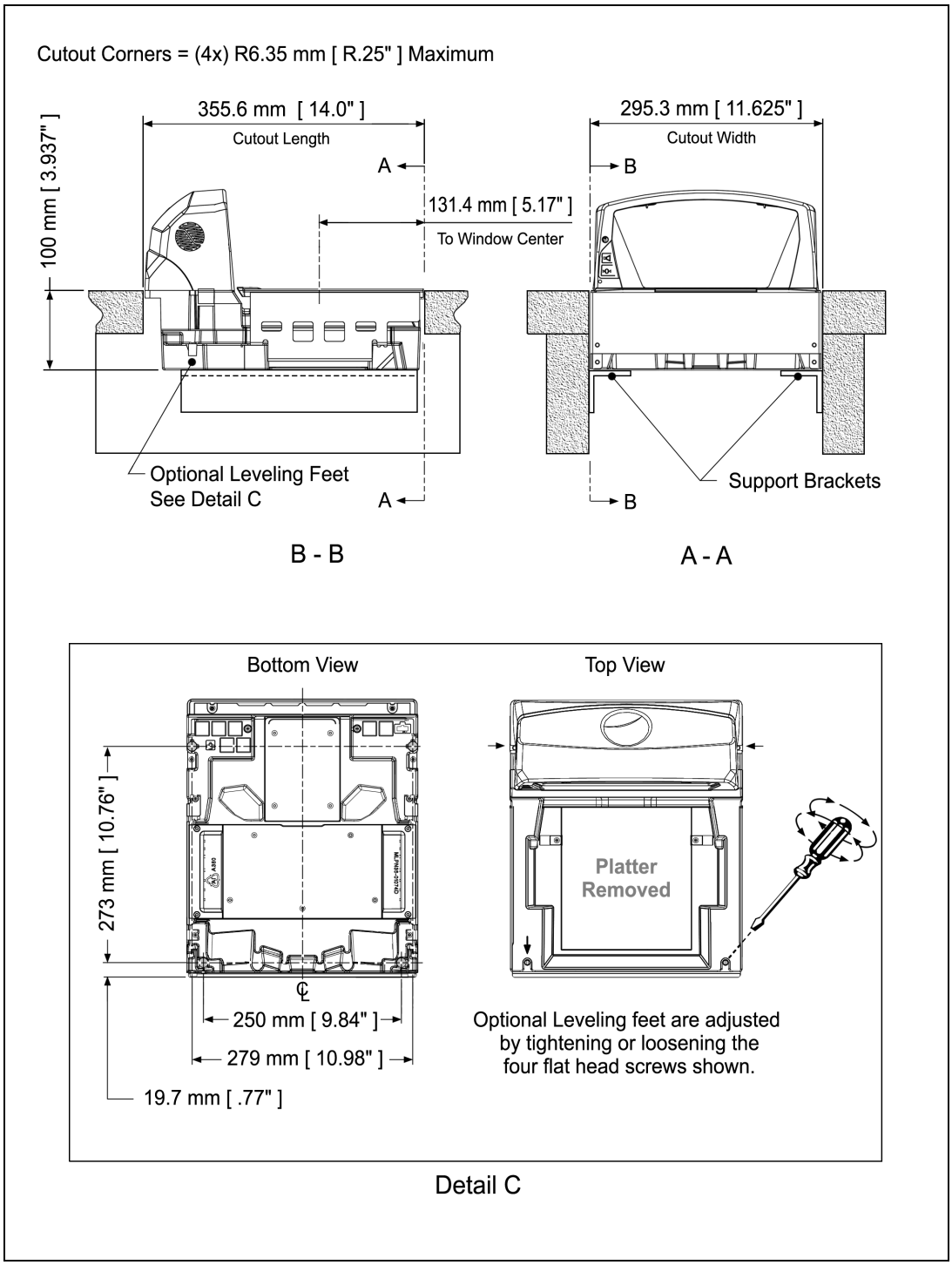



*Figure 18. MS2422 Mounting Diagram*

*Specifications are subject to change without notice.*

## *Installing the Unit in the Counter*

### *MS2431 Mounting Diagram (Two Point Support)*

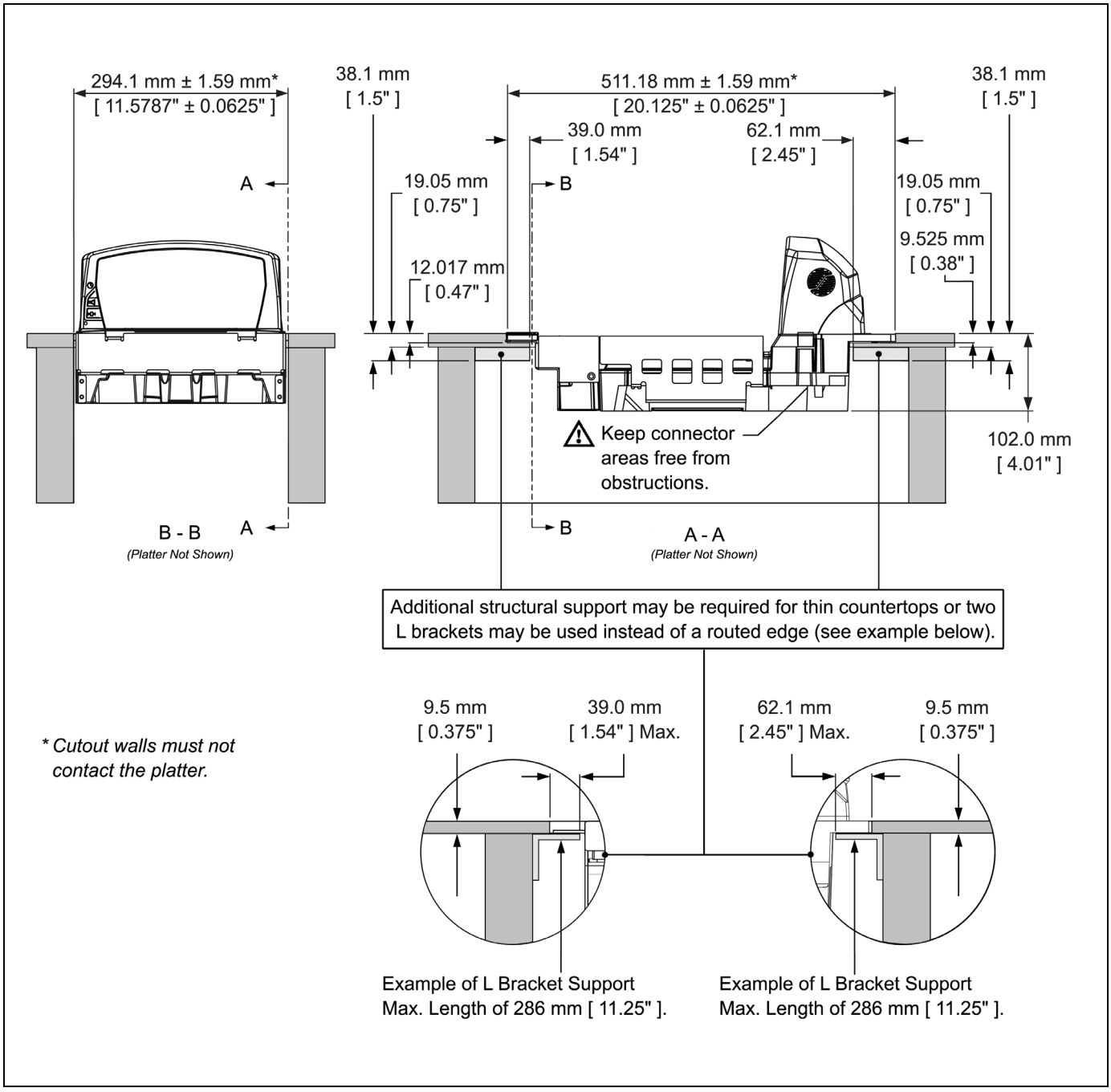



*Figure 19. MS2431 Mounting Diagram, Two Point Support*

*Specifications are subject to change without notice.*

## *Installing the Unit in the Counter*

### *MS2431 Mounting Diagram (Three Point Support)*

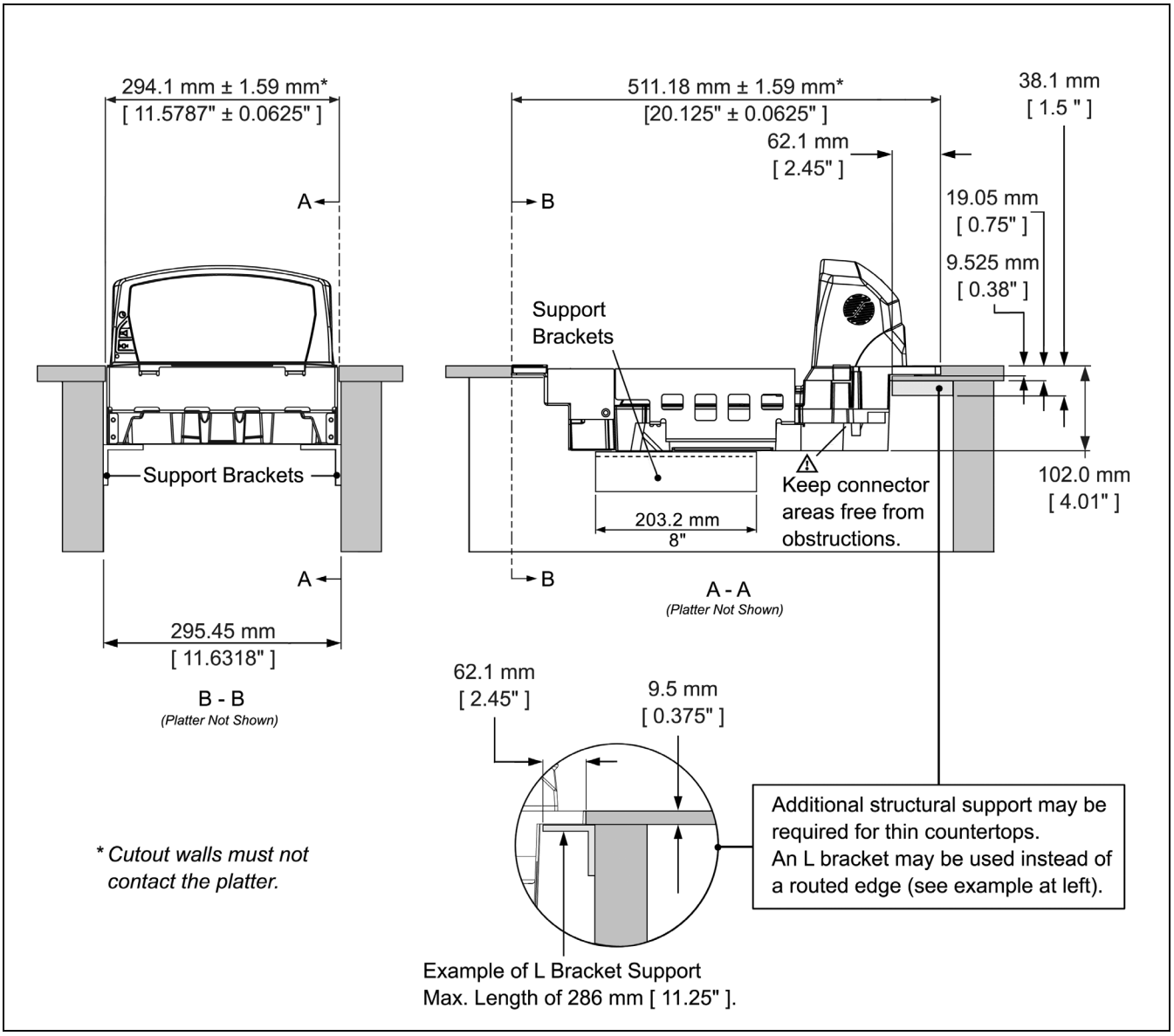



*Figure 20. MS2431 Mounting Diagram, Three Point Support*

*Specifications are subject to change without notice.*

## *Cable Installation (Interface Specific)*

### *RS232*

The following steps describe how to properly install the cables for an RS232 application. The scanner **must** then be configured to match the host's RS232 parameters. Cable installation alone **does not** guarantee that the scanner will communicate properly with the host system.

*Note: Configuration bar codes are located in the MetroSelect Configuration Guide (PN 00-02407x) and the MS2xxx Stratos Series Configuration Addendum (PN 00-02034x).*

1. Turn off the host system.
2. Plug the 10-pin RJ45 end of the RS232 interface cable (PN 57-57210x-N-3) into the 10-pin socket labeled 'Scanner Host RS232' on the bottom of the scanner. Refer to the figure on page 23.
3. Connect the other end of the RS232 cable to the proper communication port on the host device.

   ***Stop:*** *Before continuing, verify that the RS232 interface cable is connected to the appropriate interface socket on the scanner. An incorrect cable connection can cause communication problems or potential damage to the scanner and/or terminal.*

4. Plug the external power supply (PN 46-002xx) into the 3-pin Molex socket labeled 'DC Power In' on the bottom of the scanner.

   *Note: Check the AC input requirements of the power supply to make sure the voltage matches the AC outlet. The outlet should be located near the equipment and be easily accessible.*

   *Using a switched AC outlet is recommended. The switch should be located on the operator's side of the checkout counter in close proximity to the scanner to facilitate calibration and service of the unit.*

5. Connect AC power to the transformer. If the AC outlet is equipped with an on/off switch, turn the power on.
6. Turn on the host system.
7. Scan the Recall Defaults bar code.

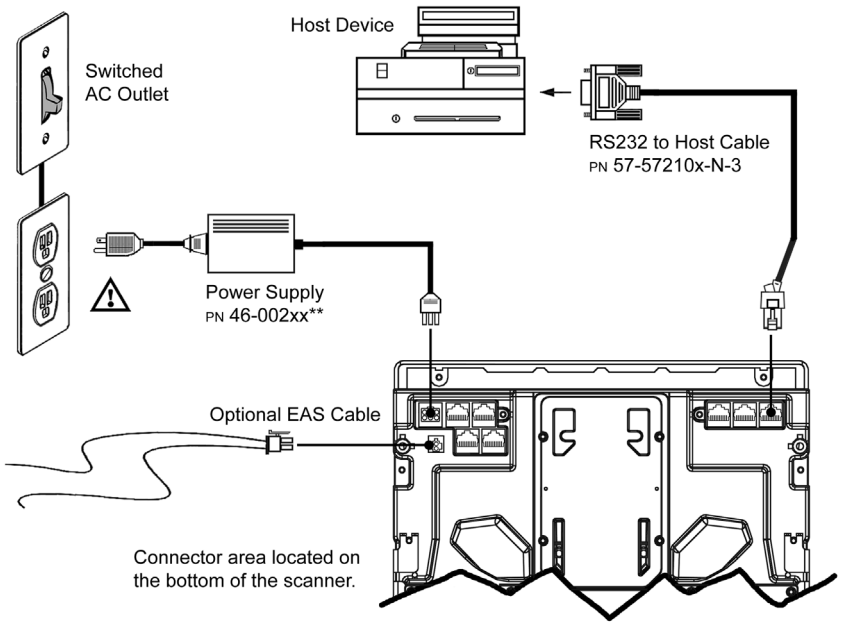
   *Note: The Recall Defaults bar code is located in the MetroSelect Configuration Guide (PN 00-02407x), under Need to Start Over.*

8. Configure the scanner to match the host system's RS232 parameters.

   *Note: Refer to the MetroSelect Configuration Guide (PN 00-02407x) under Section G: RS232 for enabling RS232 Mode (scan the recall defaults bar code first).*

## *Cable Installation (Interface Specific)*

### *RS232*




*xx*** *Specifies international connection. See the Base Kit Components and Optional Accessories section of this guide for a complete listing.*

⚠ *See power source caution statement on pages 10 or 13 of this manual.*

*Figure 21. RS232 Interface Cable Installation Schematic*

## *Cable Installation (Interface Specific)*

### *Full Speed USB*

The following steps describe how to properly install the cables for a Full Speed USB scanner application. The scanner **must** then be configured to match the host's USB parameters. Cable installation alone **does not** guarantee that the scanner will communicate properly with the host system.

*Note: Configuration bar codes are located in the MetroSelect Configuration Guide (PN 00-02407x) and the MS2xxx Stratos Series Configuration Addendum (PN 00-02034x).*

1. Turn off the host system.
2. Plug the 10-pin RJ45 end of the USB interface cable (PN 57-57201x-N-3 or 57-57227x-N-3) into the 10-pin socket labeled 'Scanner Host USB' on the bottom of the scanner. Refer to the figure on page 25.
3. Connect the other end of the USB interface cable to the appropriate USB port on the host device.

   ***Stop:*** *Before continuing, verify that the USB interface cable is connected to the appropriate socket on the scanner. An incorrect cable connection can cause communication problems or potential damage to the scanner and/or terminal.*

   *Note: Plugging the scanner into the USB port of the host does not guarantee that scanned information will appear at the host. A software driver and correct configuration setting are also required for proper communication to occur.*

4. Plug the external power supply (PN 46-002xx) into the 3-pin Molex socket labeled 'DC Power In' on the bottom of the scanner.

   *Note: Check the AC input requirements of the power supply to make sure the voltage matches the AC outlet. The outlet should be located near the equipment and be easily accessible.*

   *Using a switched AC outlet is recommended. The switch should be located on the operator's side of the checkout counter in close proximity to the scanner to facilitate calibration and service of the unit.*

5. Connect AC power to the transformer. If the AC outlet is equipped with an on/off switch, turn the power on.
6. Turn on the host system.
7. Configure the scanner to match the host system's USB parameters.

   *Note: The IBM OEM Full Speed USB Communication Defaults** bar code is located in the MS2xxx Stratos Series Configuration Addendum (PN 00-02034x) under Scanner Configuration Bar Codes: Dual Cable Scanner Configuration Bar Codes, IBM OEM Full Speed USB Communication Defaults and IBM OEM Full Speed USB Protocols.*

** *Applies only with MS2421/MS2431 non-scale scanner models. If a scale has been integrated into a scale ready MS2421/MS2431, the configuration bar code shown does not apply.*

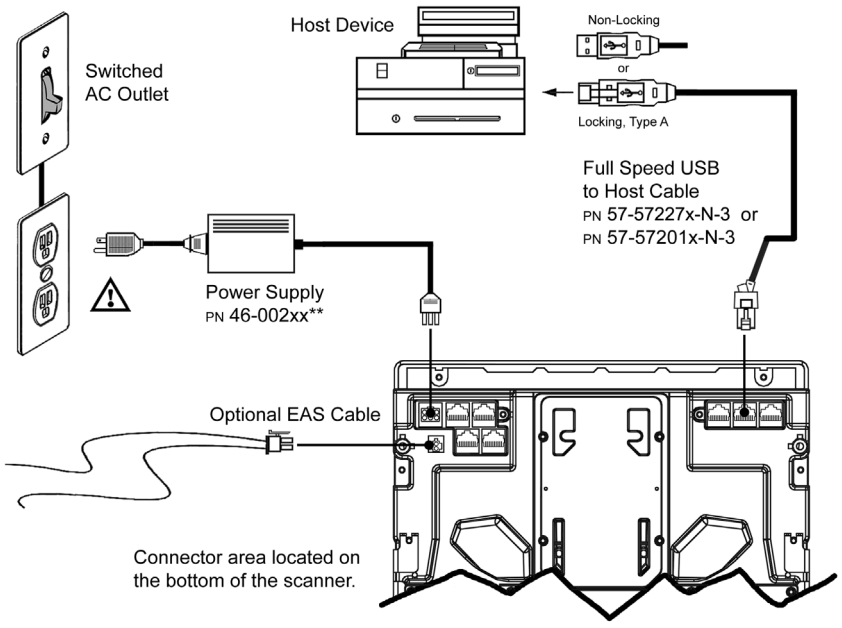
## *Cable Installation (Interface Specific)*

### *Full Speed USB*

**Step 8 is for USB Serial Emulation Mode or Keyboard Emulation Mode only.**

8. Configure the scanner for USB Serial Emulation Mode or USB Keyboard Emulation Mode by scanning the appropriate configuration bar codes in the USB section of the MetroSelect Configuration Guide (PN 00-02407x) under *Low Speed USB*. Any low speed USB warnings may be disregarded when utilizing these codes for a Full Speed USB scanner.

   *Note: Step 7 must be completed before continuing to step 8 for these features to work properly.*




*xx*** *Specifies international connection. See the Base Kit Components and Optional Accessories section of this guide for a complete listing.*

⚠ *See power source caution statement on pages 10 or 13 of this manual.*

*Figure 22. USB Cable Installation Schematic*

## *Cable Installation (Interface Specific)*

### *RS485*

The following steps describe how to properly install the cables for an RS485 scanner application. The scanner **must** then be configured to match the host's RS485 parameters. Cable installation alone **does not** guarantee that the scanner will communicate properly with the host system.

*Note: Configuration bar codes are located in the MetroSelect Configuration Guide (PN 00-02407x) and the MS2xxx Stratos Series Configuration Addendum (PN 00-02034x).*

1. Turn off the host system.
2. Plug the 10-pin RJ45 end of the RS485 interface cable (PN 57-57212x-N-3) into the 10-pin socket labeled 'Scanner Host 46xx' on the bottom of the scanner. Refer to the figure on page 27.
3. Connect the other end of the RS485 cable to communication port 9 on the host device.

   ***Stop**: Before continuing, verify that the RS485 cable is connected to the appropriate interface socket on the scanner. An incorrect cable connection can cause communication problems or potential damage to the scanner and/or terminal.*

   *Note: Plugging the scanner into the serial port of the host device does not guarantee that scanned information will appear at the host device. A software driver and correct configuration settings are also required for proper communication to occur.*

4. Plug the external power supply (PN 46-002xx) into the 3-pin Molex socket labeled 'DC Power In' on the bottom of the scanner.

   *Note: Check the AC input requirements of the power supply to make sure the voltage matches the AC outlet. The outlet should be located near the equipment and be easily accessible.*

   *Using a switched AC outlet is recommended. The switch should be located on the operator's side of the checkout counter in close proximity to the scanner to facilitate calibration and service of the unit.*

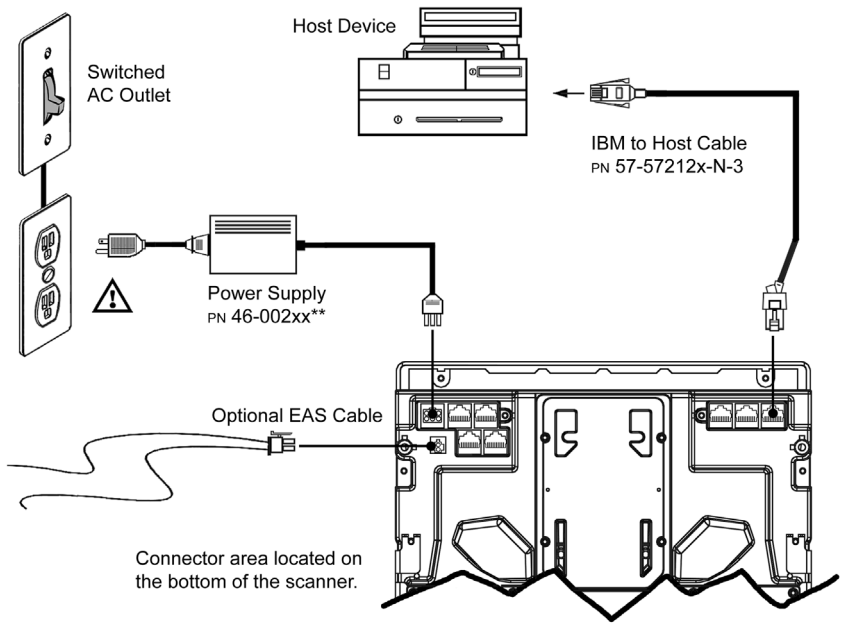
5. Connect AC power to the transformer. If the AC outlet is equipped with an on/off switch, turn the power on.
6. Turn on the host system.
7. Configure the scanner to match the host system's RS485 parameters.

   *Note: Refer to the MS2xxx Stratos Series Configuration Addendum (PN 00-02034x) under Scanner Configuration Bar Codes: IBM 3rd Generation Communication Defaults and IBM 3rd Generation Protocols.*

   *Additional general configuration bar codes can be found in the MetroSelect Configuration Guide (PN 00-02407x).*

## *Cable Installation (Interface Specific)*

### *RS485*




*xx*** *Specifies international connection. See the Base Kit Components and Optional Accessories section of this guide for a complete listing.*

⚠ *See power source caution statement on pages 10 or 13 of this manual.*

*Figure 23. RS485 Cable Installation Schematic*

## *Cable Installation (Secondary Honeywell Scanner)*

The following steps describe how to properly install the cables between a secondary Honeywell scanner and the MS2421/MS2422/MS2431 scanner. The MS2421/MS2422/MS2431 and the secondary scanner **must** then be configured to communicate properly. Cable installation alone **does not** guarantee that the MS2421/MS2422/MS2431 scanner will communicate properly with the host system and secondary scanner.

*Note: Contact a customer service representative before connecting another manufacturer's scanner to the MS2421/MS2422 as a secondary scanner.*

*Configuration bar codes are located in the MS2xxx Stratos Series Configuration Addendum (PN 00-02034x) under Scanner Configuration Bar Codes: Auxiliary Port, Quick Start for a Secondary Honeywell Scanner.*

1. Refer to pages 22 - 26 for the type of interface (RS232, RS485, etc.) required for your application. Follow the cable installation steps under the appropriate interface before continuing. Once the communication and power cables have been installed follow step 2 below for the secondary scanner installation.
2. Connect the **straight** end of the RS232 PowerLink AUX cable (PN 57-57099x-3 or PN 57-57099x-3-12) into the RS232 socket of the **secondary** scanner (see the figure on page 29).
3. Connect the **angled** end of the RS232 AUX cable (PN 57-57099x-3 or PN 57-57099x-3-12) into the 10-pin socket labeled 'Aux RS232 In', on the bottom of the MS2421/MS2422/MS2431 scanner.

   *Note: The MS2421/MS2422/MS2431 series' aux port requires the signals; transmit, receive, RTS & CTS from the secondary scanner.*

   *For Rev G Units or later: The MS2420/MS2430's auxiliary port will support 5VDC devices with a 700mA maximum current.*

   *For Rev F units or earlier: The MS2420/MS2430's auxiliary port will support 5VDC devices with a 150mA maximum current. If the auxiliary device exceeds this specification, an external power supply will be required to power the auxiliary device. The following Honeywell scanners can receive power from MS2420/MS2430: the MS9520, MS9540, and the MS5145.*

4. **This step is required for secondary devices that require >5VDC and/or 700mA current to operate.** Skip to step 5 if the secondary device requires ≤ 5VDC.

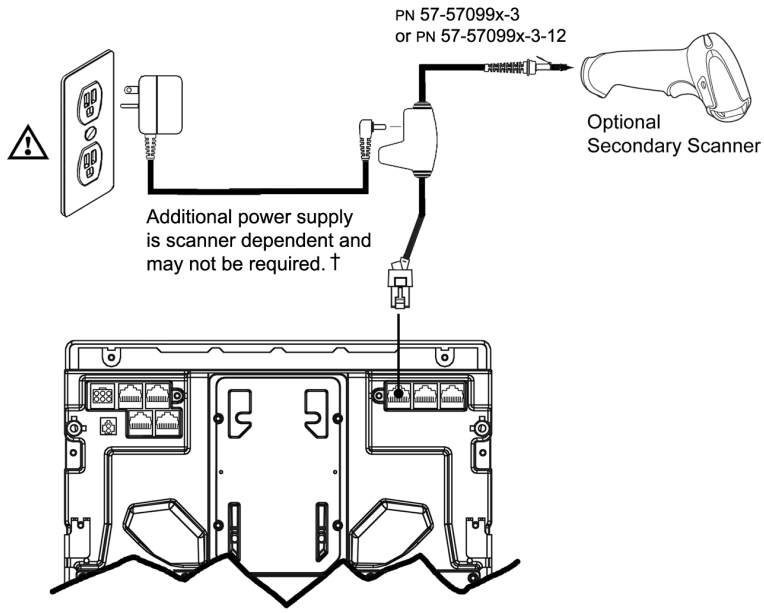
   Plug the power supply into the **secondary** scanner's PowerLink cable (PN 57-57099x-3 or PN 57-57099x-3-12)) and connect AC power to the secondary scanner.

   *Note: Check the AC input requirements of the power supply to make sure the voltage matches the AC outlet. The outlet should be located near the equipment and be easily accessible.*

5. Configure the MS2421/MS2422/MS2431 scanner and the secondary scanner. The auxiliary input port's data format must match the main output format of the secondary scanner.

   *Note: Refer to the MS2xxx Stratos Series Configuration Addendum (PN 00-02034x) under Scanner Configuration Bar Codes: Auxiliary Port, Quick Start for a Secondary Honeywell Scanners.*

## *Cable Installation (Secondary Honeywell Scanner)*




† *See Aux power notes on page 28*

⚠ *See power source caution statement on pages 10 or 13 of this manual.*

*Figure 24. Secondary Scanner Cable Installation Schematic*

## *EAS Deactivation*

SW1 and SW2 are the switch banks inside the Checkpoint device that set the deactivation range. The following is a list of Checkpoint recommended switch bank settings.

| Base Model | Checkpoint Recommended Switch Bank Settings |
|---|---|
| MS2421 | SW1 & SW2 switches 1 and 6 set to ON |
| MS2422 | SW1 & SW2 switches 1 and 6 set to ON |
| MS2431 | SW1 & SW2 switches 1 and 6 set to ON |

All MS2421/MS2422/MS2431 models have a connector labeled EAS In on the bottom of the unit. An optional EAS cable (PN 52-52511 or 52-52556) available for purchase for connection between the Checkpoint device and the MS2421/MS2422/MS2431 scanner.

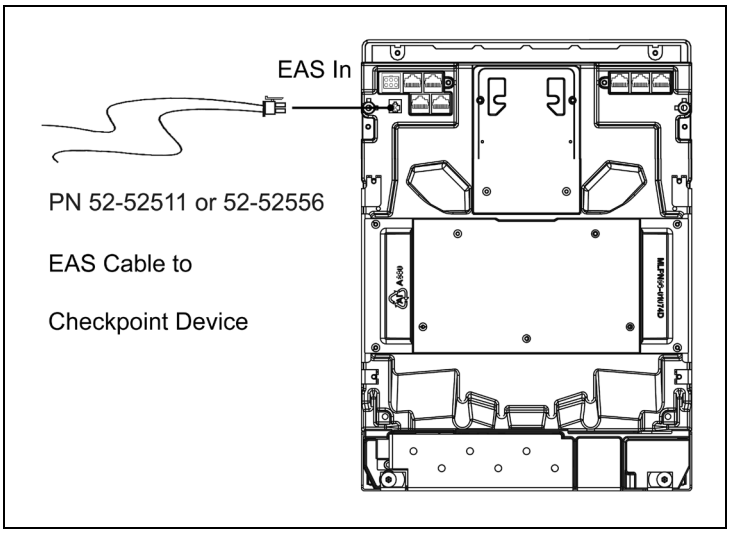



*Figure 25. EAS Cable Connection (Bottom of MS2421/MS2422/MS2431)*

The following figure shows the location of the EAS deactivation area for the MS2421/MS2422/MS2431 scanner. It is important to pass the entire tag through this area to deactivate the security tag.

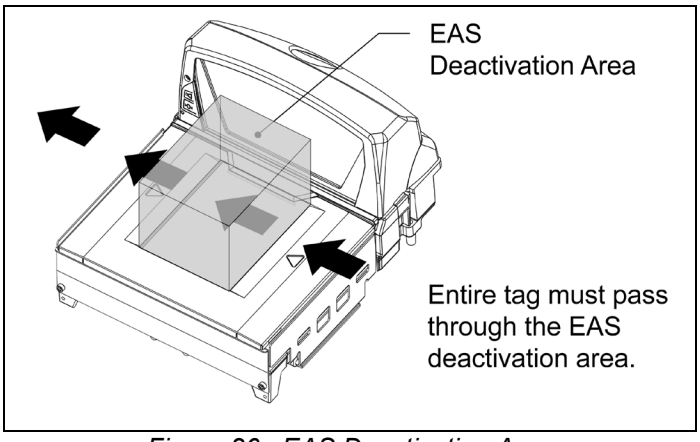



*Figure 26. EAS Deactivation Area*

## Scan Zone

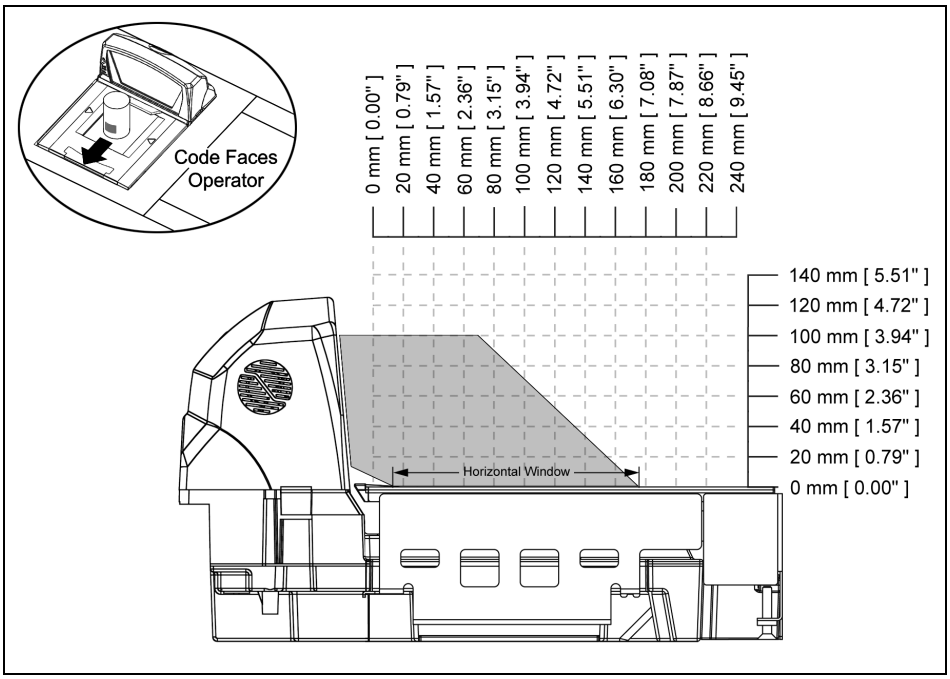



*Figure 27. Checker-Side (13 mil)*

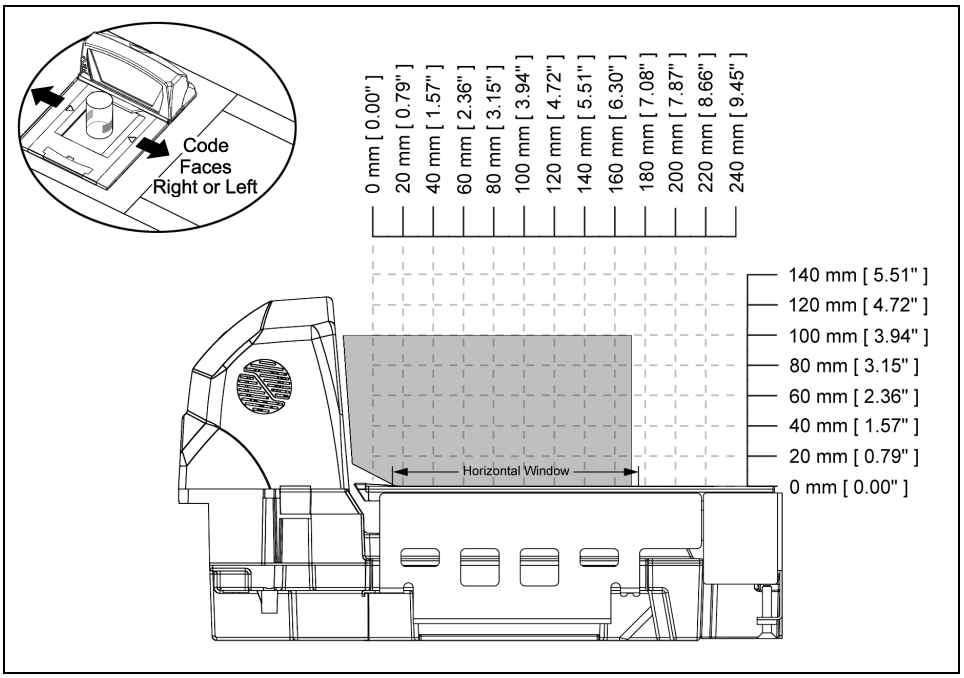



*Figure 28. Horizontal Left/Right (13 mil)*

*Specifications are subject to change without notice.*

*Typical scan zones shown.*

## *Scan Zone*

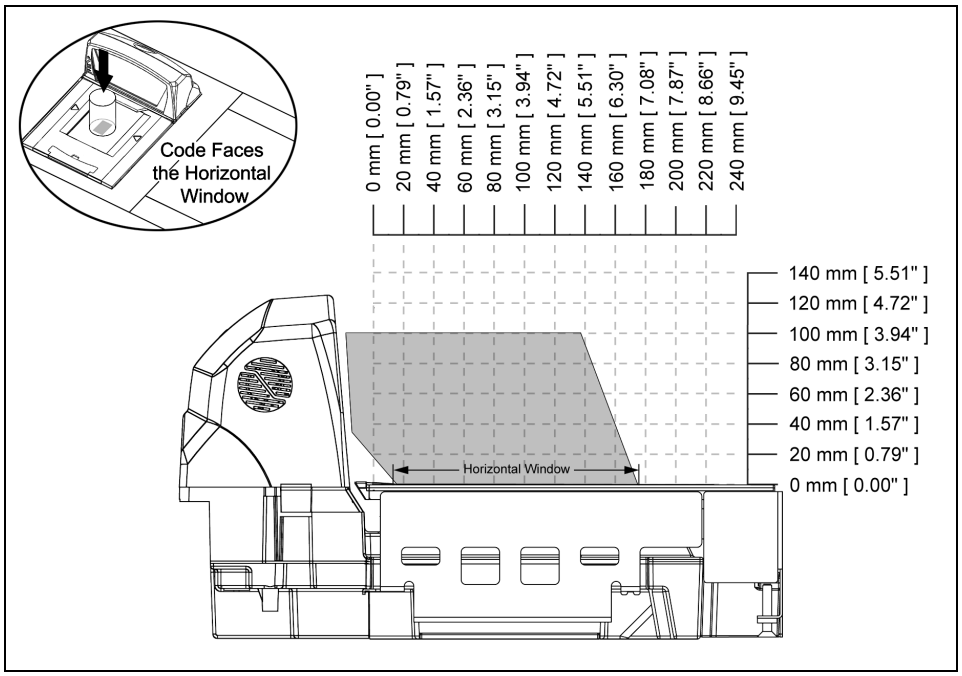



*Figure 29. Horizontal Direct (13 mil)*

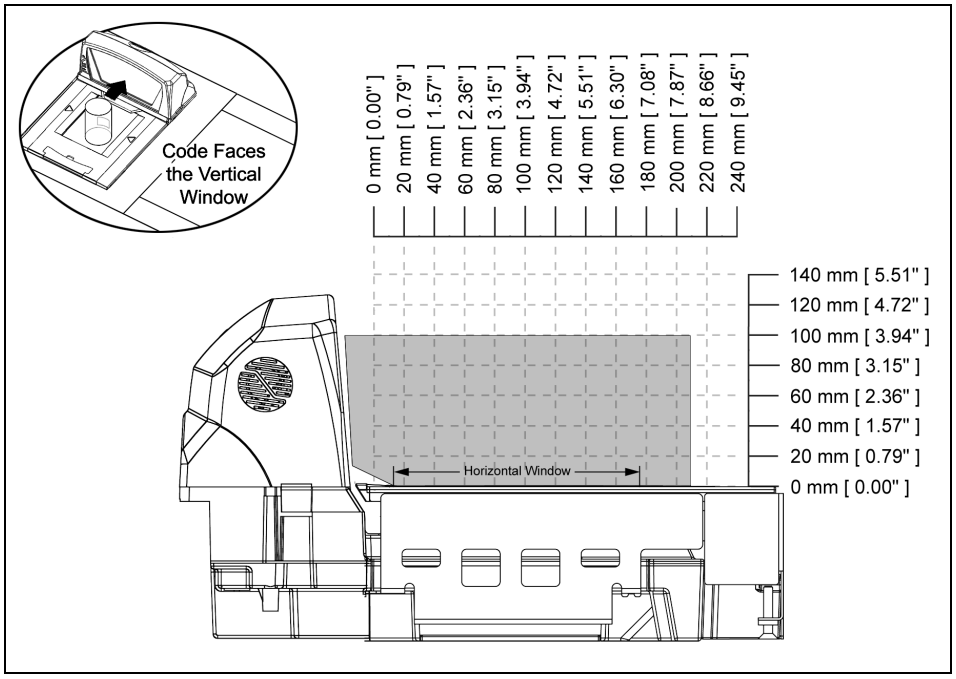



*Figure 30. Vertical Direct (13 mil)*

*Specifications are subject to change without notice.*

*Typical Scan Zones shown.*

## *Wake Activation Area (Photocell LED Output)*

The MS2421/MS2422/MS2431 scanner's default power save mode† is Dual Action Power Save Mode #2 (see page 41). This power save mode turns the laser OFF after a configured period of non-use then turns the motor OFF after thirty-minute intervals. Any movement detected by the photocell in the activation area, shown below in grey, will cause the scanner to exit the power save mode. The motor will restart automatically and the laser will turn back on preparing the scanner for bar code recognition, decoding, and transmission.

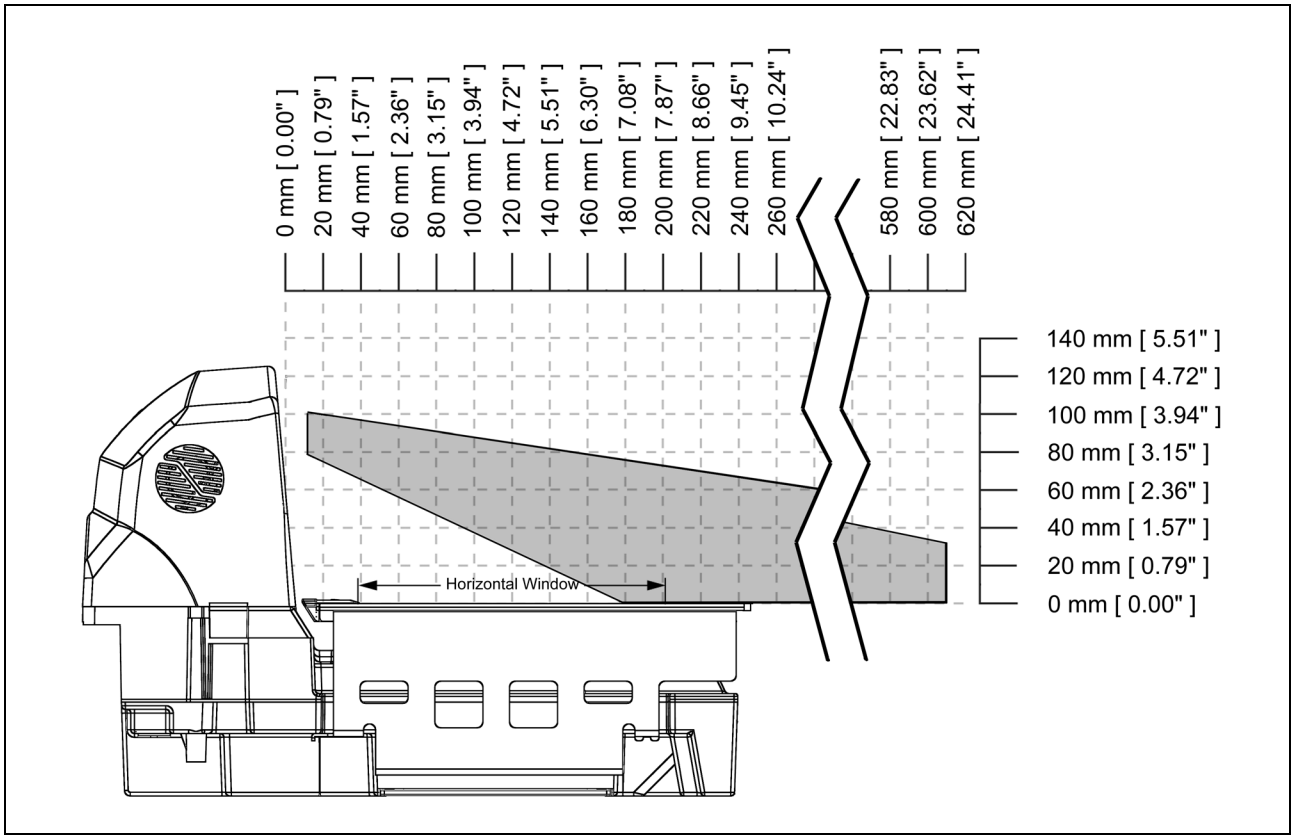



*Figure 31. Wake Activation Area Perpendicular to Package Flow Default Range (Photocell LED Output)*

† *Refer to the MetroSelect Configuration Guide (00-02407) for additional information on configurable power save modes.*

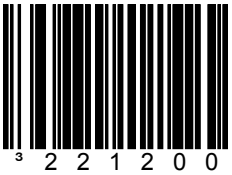
*Specifications are subject to change without notice.*

## *Wake Activation Area Sensitivity (Photocell LED Output Range)*

### *Changing the Wake Area Sensitivity Level (Photocell LED Range Adjust)*

The MS2400 Series bar code scanner wake area sensitivity level can be set to the end users preference by scanning one of the Photocell Sensitivity adjustment bar codes below.

*Max Photocell Sensitivity




This feature enables the MS24xx to be at Max sensitivity or far sensing for the wake up photo transistor.

** This is the default setting.*

Medium Photocell Sensitivity

This feature enables the MS24xx to be at a medium 1 sensitivity or medium sensing for the wake up photo transistor.

Low Photocell Sensitivity

This feature enables the MS24xx to be at a low sensitivity or low sensing for the wake up photo transistor.

Minimum Photocell Sensitivity

This feature enables the MS24xx to be at the lowest sensitivity (close only) for the wake up photo transistor.

* *MS2400 Series Bar Code Scanner Default Setting*

## *Audible Indicators*

When in operation, the MS2421/MS2422/MS2431 scanner provides audible feedback that indicates the status of the unit and the current scan. Eight settings are available for the tone of the beep (normal, six alternate tones and no tone) plus three volume settings. To change the tone or volume, refer to the *Changing the Beeper Tone and Volume* section of this manual.

### *One Beep*

When the scanner first receives power, the blue LED will turn on and the scanner will beep once. The scanner is now ready to scan.

When the scanner successfully reads a bar code, the blue LED will flash and the scanner beeps once (if configured to do so). If the scanner does not beep once and the blue light does not flash, then the bar code has not been successfully read.

### *Razzberry Tone*

This is a failure indicator. Refer to failure modes on page 37.

### *Three Beeps - during operation*

When placing the scanner in configuration mode, the blue LED will flash while the scanner simultaneously beeps three times. The blue LED will continue to flash until the unit exits configuration mode. Upon exiting configuration mode, the scanner will beep three times and the blue LED will stop flashing.

When configured, three beeps can also indicate a communications timeout during normal scanning mode.

When using one-code-configuring, the scanner will beep three times (the current selected tone), followed by a short pause, a high tone, and a low tone. This tells the user that the single configuration bar code has successfully configured the scanner.

### *Three Beeps - on power up*

This is a failure indicator. Refer to failure modes on page 37.

### *Descending Tone*

The scanner will emit a descending tone when the microprocessor is about to Flash upgrade.

### *Ascending Tone*

The scanner will emit an ascending tone when the interface coprocessor is about to Flash upgrade.

## *Visual Indicators*

Blue LED is located near the bottom corner of the vertical output window. When the scanner is ON, the flashing or constant illumination of the LED indicates the status of the scanner and the current scan.

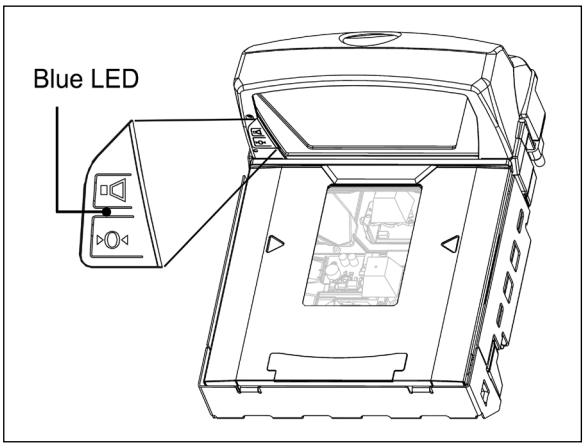



*Figure 32. Blue LED*

### *No Blue LED*

The blue LED will not be illuminated if the scanner is not receiving power from the host or transformer. They are also not illuminated when all lasers are turned off.

### *Steady Blue*

When all lasers are active, the blue LED is illuminated. The blue LED will remain illuminated until all lasers are deactivated.

### *Steady Blue and Single blue Flash*

When the scanner successfully reads a bar code, the blue LED will flash and the scanner will beep once. If the blue LED does not flash or the scanner does not beep once, then the bar code has not been successfully read.

### *Blue LED Off*

After a successful scan, the scanner transmits the data to the host device. Some communication modes require that the host inform the scanner when data is ready to be received. If the host is not ready to accept the information, the scanner's blue LED will remain off until the data can be transmitted.

*or*

This indicates the scanner may be waiting for communication from the host.

### *Flashing Blue*

This indicates the scanner is in program mode. A razzberry tone indicates that an invalid bar code has been scanned in this mode.

*or*

If the unit is in sleep mode, the blue LED will flash once every 15 seconds.

*or*

This indicates there is an error active on the diagnostic indicator display (see Error Codes on page 38). The scanner may continue to operate depending on the type of error.

## *Failure Modes*

### *Flashing Blue and One Razzberry Tone*

This indicates that the scanner has experienced a laser subsystem failure. The scanner will try up to three times to correct the failure condition. If the laser subsystem continues to fail, that subsystem (horizontal or vertical) will be shut down and an error indication will be shown on the Diagnostic Indicator Display. This error stays on the display until corrected. If the remaining subsystem is still operational, scanning will continue using the operational components.

### *Flashing Blue and Two Razzberry Tones*

This indicates that the scanner has experienced a motor subsystem failure. The scanner will try up to three times to correct the failure condition. If the motor subsystem continues to fail, that subsystem (horizontal or vertical) will be shut down and an error indication will be shown on the Diagnostic Indicator Display. This error stays on the display until corrected. If the remaining subsystem is still operational, scanning will continue using the still operational components.

### *Continuous Razzberry Tone with Blue LED Off*

If, upon power up, the scanner emits a continuous razzberry tone, then the scanner has an electronic failure. Return the unit for repair at an authorized service center.

### *Three Beeps - On Power Up*

If the scanner beeps three times on power up then, the nonvolatile memory that holds the scanner configuration has failed. Return the unit for repair at an authorized service center.

## *Diagnostic Indicator Display*

There is a two-digit error code display located under horizontal output window near the top of the platter (see figure below).

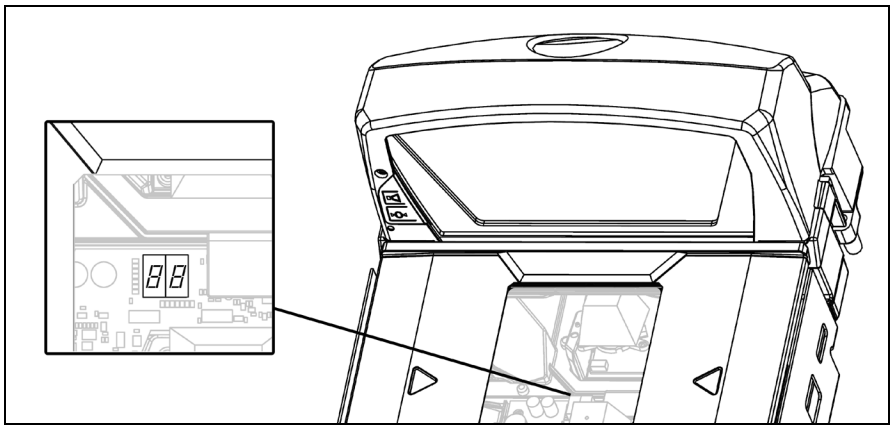


*Figure 33. Error Code Display*

The following is a list of possible error codes and their meanings. Some errors will require immediate scanner maintenance.

| Error Code | Description |
|---|---|
| 01 | Reserved |
| 02 | RAM ERROR – The scanner's Random Access Memory (RAM) is tested as faulty. Return the unit for repair at an authorized service center. |
| 03 | PROGRAM ERROR – The scanner's software program is failing. Return the unit for repair. |
| 04 | INTERFACE ERROR – After power up and any application exit (e.g. MetroSet, etc.), the scanner checks the interface hardware with that chosen in configuration. If they do not agree, an interface error exists. Correct this problem by getting the proper hardware interface OR programming MS2421/MS2422/MS2431 configuration for the proper interface hardware attached. |
| 05 | CONFIGURATION ERROR – The non-volatile configuration memory did not agree with the data last saved. Default configuration data is then used and the scanner continues operating. This error is also accompanied by three beeps. This error will remain during operation as a reminder that this power cycle is scanning against a default-generated configuration. |
| 06 | COMMUNICATION ERROR – The RS232 data line is being held active. This causes the scanner to read a "break" signal constantly and continuous attempts are made to enter MetroSet configuration mode. A short on the RX Data line can cause this condition. It can also be the result of a laptop in power save mode. The scanner will abort attempts to enter configuration mode after a short timeout. The scanner can automatically recover from this condition once the short in the RX Data line is corrected. |

| Error Code | Description |
|---|---|
| 09 | COPROCESSOR COMMUNICATION ERROR – The main microprocessor is not communicating with the interface coprocessor. The interface coprocessor may be in a fault condition with the host or just not able to respond. This error may appear when the scanner is configured for USB or RS485 interface applications or during an attempt to update the interface software through the flash utility. The unit should be repaired at an authorized service center. |
| 11 | SWITCH ERROR – The switch used for volume selection or sleep mode is detected in error (always closed). The condition is self-correcting if possible. If the error persists, return the unit for repair at an authorized service center. The scanning operation can continue with this error active. |
| 21 | LASER #1 (VERTICAL) ERROR – The laser in the vertical scanning subsystem denotes a failure. The scanner will try three times to correct the laser operation. If the laser error persists, the vertical scanning subsystem will be shut down and this error code will remain on the Diagnostic Indicators. |
| 22 | LASER #2 (RIGHT HORIZONTAL) ERROR – The right laser in the horizontal scanning subsystem denotes a failure. The scanner will try three times to correct the laser operation. If the laser error persists, and the left horizontal laser (#3) is also in error, the horizontal scanning subsystem will be shut down and this error code will remain on the Diagnostic Indicators. |
| 23 | LASER #3 (LEFT HORIZONTAL) ERROR – The left laser in the horizontal scanning subsystem denotes a failure. The scanner will try three times to correct the laser operation. If the laser error persists, and the right horizontal laser (#2) is also in error, the horizontal scanning subsystem will be shut down and this error code will remain on the Diagnostic Indicators. |
| 24 | LASER #1 (VERTICAL) HIGH CURRENT WARNING – The laser in the vertical scanning subsystem is drawing excessive current. This could be a warning for a future total failure. Have the unit checked at an authorized service center when convenient. |
| 25 | LASER #2 (RIGHT HORIZONTAL) HIGH CURRENT WARNING – The laser in the vertical scanning subsystem is drawing excessive current. This could be a warning for a future total failure. Have the unit checked at an authorized service center when convenient. |
| 26 | LASER #3 (LEFT HORIZONTAL) HIGH CURRENT WARNING – The laser in the vertical scanning subsystem is drawing excessive current. This could be a warning for a future total failure. Have the unit checked at an authorized service center when convenient. |
| 27 | LASER #1 (VERTICAL) UNDERCURRENT WARNING – The laser in the vertical scanning subsystem is drawing too little current. The laser is probably not on. This could be the result of a loss of the required set point in memory. Have the unit checked at an authorized service center. |

| Error Code | Description |
|---|---|
| 28 | LASER #2 (RIGHT HORIZONTAL) UNDERCURRENT WARNING – The laser in the right horizontal scanning subsystem is drawing too little current. The laser is probably not on. This could be the result of a loss of the required set point in memory. Have the unit checked at an authorized service center. |
| 29 | LASER #3 (LEFT HORIZONTAL) UNDERCURRENT WARNING – The laser in the left vertical scanning subsystem is drawing too little current. The laser is probably not on. This could be the result of a loss of the required set point in memory. Have the unit checked at an authorized service center. |
| 31 | MOTOR #1 (VERTICAL) ERROR – The motor in the vertical scanning subsystem denotes a failure. The scanner will try three times to correct the motor operation. If the motor error persists, the vertical scanning subsystem will be shut down and this error code will remain on the Diagnostic Indicators. |
| 32 | MOTOR #2 (HORIZONTAL) ERROR – The motor in the horizontal scanning subsystem denotes a failure. The scanner will try three times to correct the motor operation. If the motor error persists, the horizontal scanning subsystem will be shut down and this error code will remain on the Diagnostic Indicators. |
| 34 | MOTOR #1 (VERTICAL) SPEED ERROR – The motor in the vertical section cannot be speed controlled as desired. Have the unit checked at an authorized service center. |
| 35 | MOTOR #2 (HORIZONTAL) SPEED ERROR – The motor in the horizontal section cannot be speed controlled as desired. Have the unit checked at an authorized service center. |

## *Power Save Modes*

The MS2421/MS2422/MS2431 bar code scanners have five configurable power save modes. Refer to the MetroSelect Configuration Guide for additional information on Power Save Modes.

1. Blink Power Save Mode:

   Blinks the laser OFF & ON after a configured period of non-use.

   When the scanner recognizes a bar code it will exit the Blink mode.

2. Laser Off Power Save Mode:

   Turns the laser OFF after a configured period of non-use. The motor continues to spin allowing for a faster "wake" up time.

   Any movement detected by the photocell will "wake" the scanner from the Laser Off power save mode (see Figure 31 on page 33).

3. Laser & Motor Off Power Save Mode:

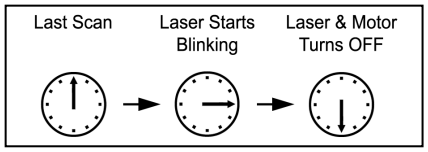
   Turns the laser and motor OFF after a configured period of non-use.

   Any movement detected by the photocell will "wake" the scanner from the power save mode (see Figure 31 on page 33). This mode's "wake" time is slightly longer due to the motor's need to restart.

4. Dual Action Power Save Mode #1:

   "Blinks" the laser OFF & ON after a configured period of non-use turns the laser and motor OFF at thirty-minute intervals.

   Example:
   If the power save timeout is set to 15 minutes.

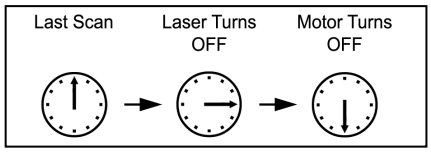



   Any movement detected by the photocell will "wake" the scanner from the power save mode (see Figure 31 on page 33).

5. Dual Action Power Save Mode #2 (Default):

   Turns the laser OFF after a configured period of non-use then turns the motor OFF after thirty-minute intervals.

   Example:
   If the power save timeout is set to 15 minutes.




   Any movement detected by the photocell will "wake" the scanner from the power save mode (see Figure 31 on page 33).

## *Beeper Options and Button Functions*

### *Changing the Beeper Tone*

Beeper tones may be configured incrementally using the following bar code. The new tone will be heard followed by a short pause. Two more new tones will be heard signifying the new setting has been stored in memory. The silent (no beep) tone is also selectable.

N

³ 9 9 9 9 7 5

### *Changing the Beeper Volume*

Volume levels may be configured using the volume button or incrementally using the following bar code. The new volume will be heard followed by a short pause. Two more tones will be heard signifying the new setting has been saved in memory. The silent (no volume) tone is also selectable.

N

³ 9 9 9 9 7 4

### *The Multi-Function Button*

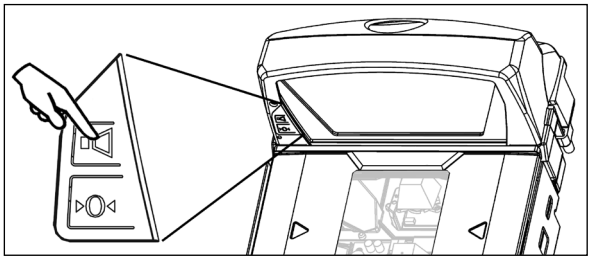


*Figure 34. The Multi-Function Button*

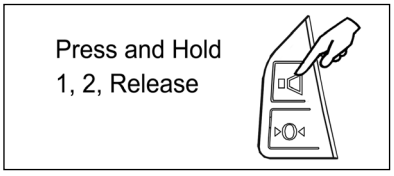



*Figure 35. Changing the Beeper Volume*

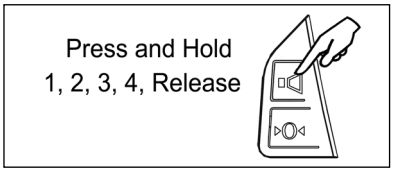



*Figure 36. Laser & Motor Off Power Save Mode*

*Figure 37. Normal Operation*

**Changing the Beeper Volume**

A short (<3 second) depression and the beeper volume will change. The new volume will be heard. The silent (no beep) volume is also selectable.

**Placing the Unit in Laser & Motor Off Power Save Mode**

Long (>3 seconds) depression. The Laser and Motor Off Power Save Mode is the only power save mode that can be activated with the multi-function button*.

* *This feature is configuration dependent. Refer to the MetroSelect Configuration Guide (PN 00-02407x) under Scanner Operation: Power Save Modes to enable this feature.*

**Waking the Unit from All Power Save Modes**

The next button depression will awaken the scanner for normal operation.

## *Startup*

When the scanner first receives power, the blue LED will turn on and the scanner will beep once. The scanner is now ready to scan.

## *Power-Up Test Mode*

When a MS2421/MS2422/MS2431 scanner is first powered up, it cycles through a number of self-tests before starting normal operation. If there are any initial failures during this sequence of tests the scanner will beep or razz to indicate the error and an error code will appear in the diagnostic indicator display.

The following are examples of the types of tests performed at power-up.

1. Memory tests
2. Hardware setup tests
3. Motor tests
4. Laser tests
5. Configuration tests
6. Interface tests

These tests are also performed on a periodic basis with the operator alerted to any failures.

## *Configuration Mode*

All MS2421/MS2422/MS2431 bar code scanners have been configured at the factory with a set of default communication protocols. Since many host systems have unique formats and protocol requirements, a wide range of configurable features that may be selected with the use of the MetroSelect Configuration Guide
(PN 00-02407x), the MS2xxx Stratos Series Configuration Addendum (PN 00-02034x) and MetroSet.

## Horizontal Scan Window Replacement

*Note: After the replacement platter has been installed, remove all protective film from the new platter's window.* ***The unit will not function properly if the protective film is not removed.***

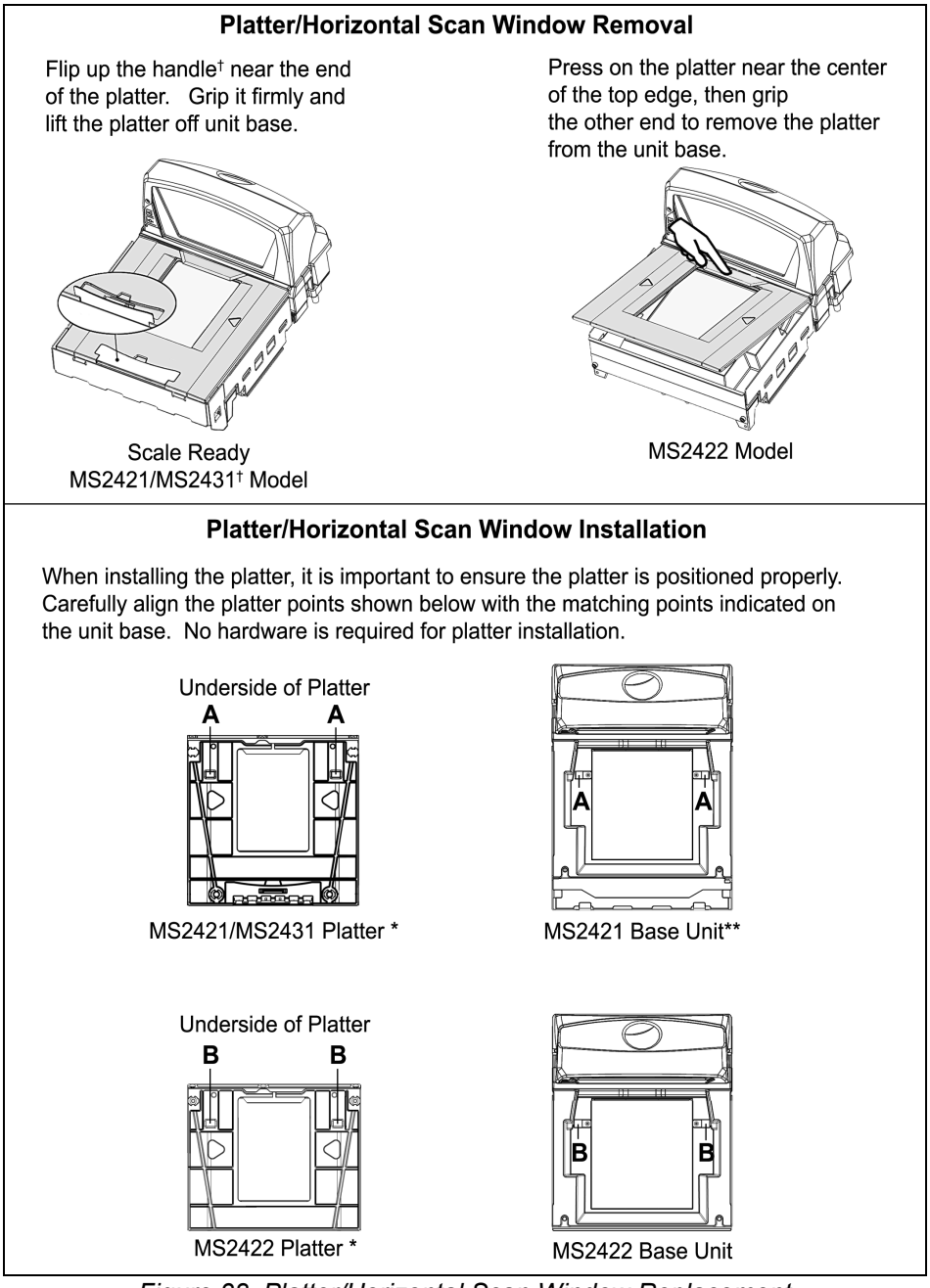

Platter/Horizontal Scan Window Removal
Flip up the handle† near the end of the platter. Grip it firmly and lift the platter off unit base.
Press on the platter near the center of the top edge, then grip the other end to remove the platter from the unit base.
Scale Ready
MS2421/MS2431† Model
MS2422 Model
Platter/Horizontal Scan Window Installation
When installing the platter, it is important to ensure the platter is positioned properly. Carefully align the platter points shown below with the matching points indicated on the unit base. No hardware is required for platter installation.
Underside of Platter
A
A
MS2421/MS2431 Platter *
A
A
MS2421 Base Unit**
Underside of Platter
B
B
MS2422 Platter *
B
B
MS2422 Base Unit

*Figure 38. Platter/Horizontal Scan Window Replacement*

* *See replacement parts on page 3.*

** *For MS2431, use the same points as shown for the MS2421 to install the platter.*

† *If the platter on the MS2421/MS2431 is not equipped with a product weight roll bar / lift handle, it can be removed using the same method as shown for the MS2422.*

### *Daily Maintenance*

Smudges and dirt on the unit's window can interfere with the unit's performance. If the horizontal or vertical output windows require cleaning, use only a mild glass cleaner containing no ammonia. When cleaning the window, spray the cleaner onto a lint free, non-abrasive cleaning cloth then gently wipe the window clean.

If the unit's case requires cleaning, use a mild cleaning agent that does not contain strong oxidizing chemicals. Strong cleaning agents may discolor or damage the unit's exterior.

Routinely check and clean the base unit to ensure that no debris is interfering with the platter movement.

# Troubleshooting

The following guide is for reference purposes only. Contact a customer service representative to preserve the limited warranty terms.

| Symptom | Possible Cause(s) | Solution |
|---|---|---|
| All Interfaces | | |
| No LED, beep, or motor spin. | No power is being supplied to the scanner. | Check the transformer, outlet, and the power strip. Make sure the power cable is plugged into the scanner. |
| During power up the unit beeps 3 times. | A non-volatile RAM failure. | Contact a customer service representative, if the unit will not hold the configuration. |
| During power up the unit razzes continuously. | There has been a diagnostic failure. | Contact a customer service representative, if the unit will not function. |
| During power up the unit razzes once and the blue LED flashes. | A VLD failure. | Contact a customer service representative. |
| During power up the unit razzes twice and blue LED flash. | Scanner motor failure. | Contact a customer service representative. |
| There are multiple scans upon presentation of code. | The same symbol timeout is set to short. | Adjust same symbol timeout for a longer time. |
| The unit powers up but does not beep. | The beeper is disabled. | Enable the beeper. |
| | No volume is selected. | Select a volume. |
| | No tone is selected. | Select a tone. |
| The unit powers up but does not scan and/or beep. | The unit is trying to scan a particular symbology that is not enabled. | UPC/EAN and Code 128 are enabled by default. Verify that the type of bar code being read has been selected. |
| | The unit has been configured for a character length lock or a minimum length and the bar code being scanned does not satisfy the configured criteria. | Verify that the bar code that is being scanned falls into the criteria.<br><br>Typical of Non-UPC/EAN codes. The scanner defaults to a minimum of 4 character bar code. |
| The unit scans a bar code, but locks up after the first scan (the blue LED stays on). | The scanner is configured to support some form of host handshaking but is not receiving the signal. | If the scanner is setup to support ACK/NAK, RTS/CTS, XON/XOFF, or D/E, verify that the host cable and host are supporting the handshaking properly. |
| The unit scans but the data transmitted to the host is incorrect. | The scanner's data format does not match the host system requirements. | Verify that the scanner's data format matches that required by the host. Make sure that the scanner is connected to the proper host port. |

| Symptom | Possible Cause(s) | Solution |
|---|---|---|
| All Interfaces | | |
| Scanner beeps at some bar codes and NOT for others of the same bar code symbology. | The print quality of the bar code is suspect. | The type of printer and/or the printer settings could be the problem.<br><br>Check the print mode or change the printer settings. For example change to econo mode or high speed. |
| | Check the character length lock. | |
| | The aspect ratio of the bar code is out of tolerance. | |
| The unit powers up but does not scan and/or beep. | The unit is trying to scan a particular symbology that is not enabled. | UPC/EAN and Code 128 are enabled by default. Verify that the type of bar code being read has been selected. |
| | The unit has been configured for a character length lock or a minimum length and the bar code being scanned does not satisfy the configured criteria. | Verify that the bar code that is being scanned falls into the criteria.<br><br>Typical of Non-UPC/EAN codes. The scanner defaults to a minimum of 4 character bar code. |
| The unit beeps at some bar codes but NOT for others of the same bar code symbology. | The bar code may have been printed incorrectly. | Check if it is a check digit, character or border problem. |
| | The scanner is not configured correctly for this type of bar code. | Check if check digits are set properly. |
| | The minimum symbol length setting does not work with the bar code. | Check if the correct minimum symbol length is set. |
| RS232 Only | | |
| The unit powers up OK and scans OK but does not communicate properly to the host. | The com port at the host is not working or is not configured properly. | Check to make sure that the baud rate and parity of the scanner and the communication port match and the program is looking for RS232 data. |
| | The cable is not connected to the proper com port. | |
| | The com port is not operating properly. | |

| Symptom | Possible Cause(s) | Solution |
|---|---|---|
| RS232 Only | | |
| The host is receiving data but the data does not look correct. | The scanner and host may not be configured for the same interface. | Check that the scanner and the host are configured for the same interface. |
| Characters are being dropped. | The intercharacter delay needs to be added to the transmitted output. | Add some intercharacter delay to the transmitted output by using the MetroSelect Configuration Guide (PN 00-02407x). |
| Aux Port Operation With Any Interface | | |
| The secondary scanner is not functioning. | | Refer to the user's guide provided with the secondary scanner. |
| The secondary scanner powers up but data is not relayed to the host. | The secondary scanner cable may not be connected to the proper port on the scanner. | Ensure that the secondary scanner is connected to the MS242x com port marked "Aux" port. |
| | The auxiliary com port may not be operating properly. | * The scanner must be configured to enable the auxiliary port. |
| | | The auxiliary input port's data format must match the main output format of the secondary scanner. |
| * *Refer to the MS2xxx Stratos Series Configuration Addendum (PN 00-02034x) under Scanner Configuration Bar Codes: Auxiliary Port, Quick Start for a Secondary Honeywell Scanner.* | | |

# Scanner and Cable Terminations

## Scanner Pinout Connections

The MS2421/MS2422/MS2431 scanner terminates to 10-pin modular jacks located on the bottom of the unit. The serial number label indicates the model number and interface of the scanner.

| EAS | |
|---|---|
| **Pin** | **Function** |
| 1 | EAS In |
| 2 | EAS Out |

| DC Power | |
|---|---|
| **Pin** | **Function** |
| 1 | *No Connect* |
| 2 | Earth Ground |
| 3 | *No Connect* |
| 4 | 5.2VDC |
| 5 | Ground |
| 6 | 12VDC |

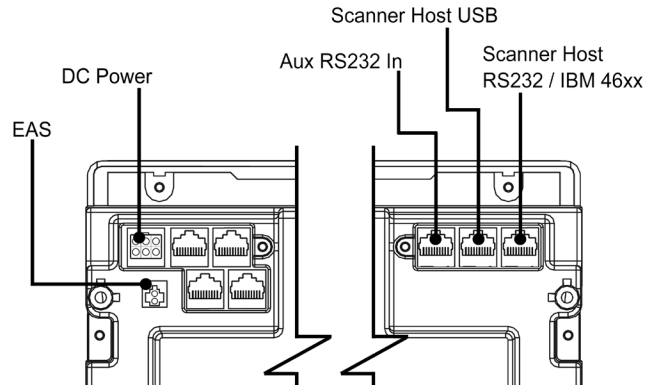



*Figure 39. Connector Layout*

| Scanner to Host, RS485 | |
|---|---|
| **Pin** | **Function** |
| 1 | Signal Ground |
| 2 | *Reserved for RS232 Interface* |
| 3 | *Reserved for RS232 Interface* |
| 4 | *Reserved for RS232 Interface* |
| 5 | *Reserved for RS232 Interface* |
| 6 | *Reserved for RS232 Interface and EAS* |
| 7 | *No Connect* |
| 8 | *Reserved for RS232 Interface and EAS* |
| 9 | IBM B- |
| 10 | IBM A+ |

| Scanner to Host, RS232 | |
|---|---|
| **Pin** | **Function** |
| 1 | Ground |
| 2 | RS232 Transmit |
| 3 | RS232 Receive |
| 4 | RS232 RTS Output |
| 5 | RS232 CTS Input |
| 6 | RS232 DTR Input (EAS GPIO IN) |
| 7 | *No Connect* |
| 8 | DSR (EAS GPIO OUT) |
| 9 | *Reserved for RS485 Interface* |
| 10 | *Reserved for RS485 Interface* |

| Scanner to Host, USB | |
|---|---|
| **Pin** | **Function** |
| 1 | Signal Ground |
| 2 | RS232 Transmit |
| 3 | RS232 Receive |
| 4 | Shield |
| 5 | *No Connect* |
| 6 | RS232 CTS Input (EAS GPIO IN) |
| 7 | PC+5VDC |
| 8 | RS232 RTS Output (EAS GPIO OUT) |
| 9 | Data - |
| 10 | Data + |

| Auxiliary RS232 In | |
|---|---|
| **Pin** | **Function** |
| 1 | Ground |
| 2 | RS232 Receive Input |
| 3 | RS232 Transmit Output |
| 4 | RS232 RTS In |
| 5 | RS232 CTS Out |
| 6 | EAS GPIO IN |
| 7 | Ground |
| 8 | EAS GPIO OUT |
| 9 | +5V Out |
| 10 | *No Connect* |

*Specifications are subject to change without notice.*

## *Scale Ready MS2421/MS2431 Models – Additional Pinout Connections*

There are four additional 10-pin modular jacks located on the bottom of the of the MS2421/MS2431 scanner models that may be used for an integrated scale application and the use of a remote display.

*Note: Please keep in mind that every application is unique. The use of these connections depends on the specifications of the scale's manufacturer. The following pinouts are for* ***reference only****. If the scanner has been integrated with a scale, refer to the Scale Addendum for detailed instructions on the appropriate cable connections, communication specifications and calibration procedures required by the scale manufacturer and local Weights and Measures authorities.* ***When connecting any combination of scale/external scale display to the MS2421/MS2431 do not exceed the following current restrictions: 12V @ 0.7A max. / 5V @ 0.2A max.***

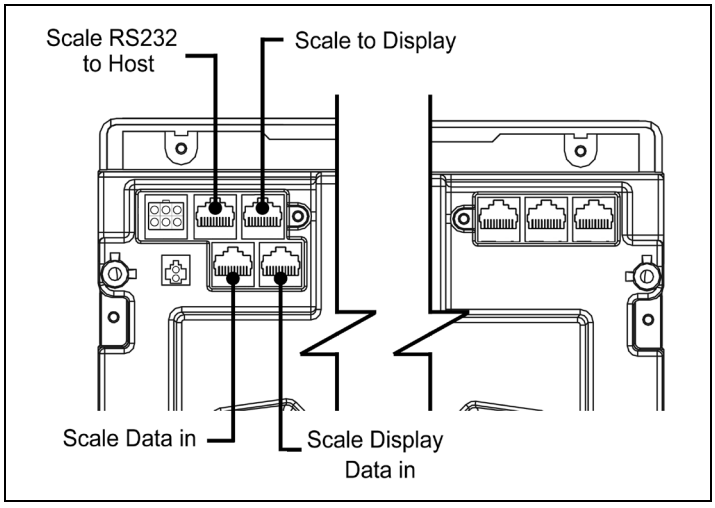



*Figure 40. Scale Ready Connector Layout*

| Scale Display Data In Scale Data to Display from the Load Cell Interface | |
|---|---|
| **Pin** | **Function **** |
| 1 | SIG1 |
| 2 | SIG2 |
| 3 | SIG3 |
| 4 | SIG4 |
| 5 | SIG5 |
| 6 | SIG6 |
| 7 | SIG7 †† |
| 8 | SIG8 †† |
| 9 | SIG9 †† |
| 10 | SIG10 †† |

| Scale Data In RS232 from the Load Cell Interface | |
|---|---|
| **Pin** | **Function**** |
| 1 | 12V |
| 2 | Ground |
| 3 | 5V |
| 4 | Ground |
| 5 | RS232 TX In |
| 6 | RS232 RX Out |
| 7 | RS232 CTS In |
| 8 | RS232 RTS Out |
| 9 | Scale Status, TTL |
| 10 | Scale Zero, TTL |

| Scale RS232 to Host Scale Data, Dual Cable Applications | |
|---|---|
| **Pin** | **Function**** |
| 1 | Ground |
| 2 | Scale RS232 TX Out |
| 3 | Scale RS232 RX In |
| 4 | Scale RS232 RTS Out |
| 5 | Scale RS232 CTS In |
| 6 | *No Connect* |
| 7 | *No Connect* |
| 8 | *No Connect* |
| 9 | *No Connect* |
| 10 | Shield |

| Scale to Display | |
|---|---|
| **Pin** | **Function**** |
| 1 | SIG1 |
| 2 | SIG2 |
| 3 | SIG3 |
| 4 | SIG4 |
| 5 | SIG5 |
| 6 | SIG6 |
| 7 | SIG7 †† |
| 8 | SIG8 †† |
| 9 | SIG9 †† |
| 10 | SIG10 †† |

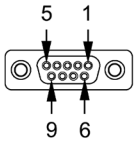
*** All signals are referenced from the MS2421/MS2431 scanner.*

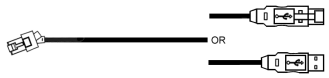
†† *The use of these pins depends upon the specifications of the scale's manufacturer.*

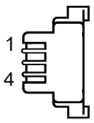
*Specifications are subject to change without notice.*

## *Cable Connector Configurations*

The following cables are examples of some of the standard cables that may be shipped with the MS2421/MS2422/MS2431 bar code scanner. Please keep in mind that every application is unique and the cables received with the MS2421/MS2422/MS2431 scanner may be custom cables that are not shown below.

| RS232 Interface Cable, PN 57-57210x-N-3 | |
|---|---|
| **Pin** / **Function**** |  9-Pin D-Type Connector |
| 1 *No Connect* | |
| 2 RS232 TX Output | |
| 3 RS232 RX Input | |
| 4 DTR Input | |
| 5 Power/Signal Ground | |
| 6 DSR Output | |
| 7 CTS Input | |
| 8 RTS Output | |
| 9 *No Connect* | |

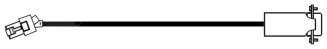
| Full Speed USB Cable,<br>PN 57-57201x-N-3 or PN 57-57227x-N-3 |  | |
|---|---|---|
| **Pin** / **Function**** | Locking, Type A<br>57-57227x-N-3 | Non-Locking, Type A<br>57-57201x-N-3 |
| 1 PC+5V USB | | |
| 2 Data - | | |
| 3 Data + | | |
| 4 Ground | | |

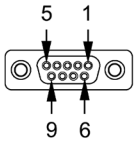
| RS485 Cable, PN 57-57212x-N-3 | |
|---|---|
| **Pin** / **Function**** |  4-Pin SDL |
| 1 Signal Ground | |
| 2 IBM A+ | |
| 3 IBM B - | |
| 4 *No Connect* | |

*** All signals are referenced from the MS2421/MS2422/MS2431 scanner.*

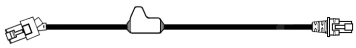
*Specifications are subject to change without notice.*

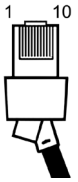
## *Cable Connector Configurations*

| Aux Port Configuration Cable*, PN 57-57008x-N-3 |  |
|---|---|
| **Pin** | **Function**** |
| 1 | *No Connect* |
| 2 | Output from Scanner |
| 3 | Input to Scanner |
| 4 | *No Connect* |
| 5 | Ground |
| 6 | *No Connect* |
| 7 | *No Connect* |
| 8 | *No Connect* |
| 9 | *No Connect* |



9-Pin D-Type Connector

| RS232 LSO/AUX Cable<br>PN 57-57099x-3 or PN 57-57099x-3-12 |  |
|---|---|
| **Pin** | **Function†** |
| 1 | Signal Ground |
| 2 | RS232 from Aux / Secondary Scanner |
| 3 | RS232 to Aux / Secondary Scanner |
| 4 | RTS from Aux / Secondary Scanner |
| 5 | CTS to Aux / Secondary Scanner |
| 6 | *No Connect* |
| 7 | *No Connect* |
| 8 | *No Connect* |
| 9 | +5VDC – Transformer / Direct |
| 10 | Shield Ground |



10-Position Angled Modular Plug

* *This configuration cable was designed to be used with the MS2421/MS2422/MS2431 auxiliary connector only.*

** *All signals are referenced from the MS2421/MS2422/MS2431 scanner.*

† *All signals are referenced from the auxiliary / secondary scanner.*

*Specifications are subject to change without notice.*

# Regulatory Compliance

## Safety

### *ITE Equipment*

IEC 60950-1 Second Edition
EN 60950-1 Second Edition

### *Laser*

Laser Class 1: IEC 60825-1: Second Edition 2007
EN 60825-1: Second Edition 2007

⚠Caution

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous laser light exposure. Under no circumstances should the customer attempt to service the laser scanner. Never attempt to look at the laser beam, even if the scanner appears to be nonfunctional. Never open the scanner in an attempt to look into the device. Doing so could result in hazardous laser light exposure. The use of optical instruments with the laser equipment will increase eye hazard.

⚠Atención

La modificación de los procedimientos, o la utilización de controles o ajustes distintos de los especificados aquí, pueden provocar una luz de láser peligrosa. Bajo ninguna circunstancia el usuario deberá realizar el mantenimiento del láser del escáner. Ni intentar mirar al haz del láser incluso cuando este no esté operativo. Tampoco deberá abrir el escáner para examinar el aparato. El hacerlo puede conllevar una exposición peligrosa a la luz de láser. El uso de instrumentos ópticos con el equipo láser puede incrementar el riesgo para la vista.

⚠Attention

L'emploi de commandes, réglages ou procédés autres que ceux décrits ici peut entraîner de graves irradiations. Le client ne doit en aucun cas essayer d'entretenir lui-même le scanner ou le laser. Ne regardez jamais directement le rayon laser, même si vous croyez que le scanner est inactif. N'ouvrez jamais le scanner pour regarder dans l'appareil. Ce faisant, vous vous exposez à une rayonnement laser qú êst hazardous. L'emploi d'appareils optiques avec cet équipement laser augmente le risque d'endommagement de la vision.

⚠Achtung

Die Verwendung anderer als der hier beschriebenen Steuerungen, Einstellungen oder Verfahren kann eine gefährliche Laserstrahlung hervorrufen. Der Kunde sollte unter keinen Umständen versuchen, den Laser-Scanner selbst zu warten. Sehen Sie niemals in den Laserstrahl, selbst wenn Sie glauben, daß der Scanner nicht aktiv ist. Öffnen Sie niemals den Scanner, um in das Gerät hineinzusehen.

⚠Attenzione

L'utilizzo di sistemi di controllo, di regolazioni o di procedimenti diversi da quelli descritti nel presente Manuale può provocare delle esposizioni a raggi laser rischiose. Il cliente non deve assolutamente tentare di riparare egli stesso lo scanner laser. Non guardate mai il raggio laser, anche se credete che lo scanner non sia attivo. Non aprite mai lo scanner per guardare dentro l'apparecchio. Facendolo potete esporVi ad una esposizione laser rischiosa. L'uso di apparecchi ottici, equipaggiati con raggi laser, aumenta il rischio di danni alla vista..

## *EMC*

### *Emissions*

FCC Part 15, ICES-003, CISPR 22, EN 55022

### *Immunity*

CISPR 24, EN 55024

*Note*: Immunity performance is not guaranteed for scanner cables greater than 3 meters in length when fully extended.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### *Class A Devices*

**The following is applicable when the scanner cable is greater in length than 3 meters (9.8 feet) when fully extended:**

**Les instructions ci-dessous s'appliquent aux cables de scanner dépassant 3 métres (9.8 pieds) de long en extension maximale:**

**Folgendes trifft zu, wenn das Scannerkabel länger als 3 Meter ist:**

This equipment has been tested and found to comply with limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their own expense. Any unauthorized changes or modifications to this equipment could void the user's authority to operate this device.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**Notice**

This Class A digital apparatus complies with Canadian ICES-003.

**Remarque**

Cet appareil numérique de classe A est conforme à la norme canadienne NMB-003.

**Warning**

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

**Warnung!**

Dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen. In diesem Fall kann vom Betreiber verlangt werden, angemessene Massnahmen durchzuführen.

**Attenzione**

Questo e' un prodotto di classe A. Se usato in vicinanza di residenze private potrebbe causare interferenze radio che potrebbero richiedere all'utilizzatore opportune misure.

**Attention**

Ce produit est de classe "A". Dans un environnement domestique, ce produit peut être la cause d'interférences radio. Dans ce cas l'utiliseteur peut être amené à predre les mesures adéquates.

## *EMC*

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### *Class B Devices*

**The following is applicable when the scanner cable is less than 3 meters (9.8 feet) in length when fully extended:**

**Les instructions ci-dessous s'appliquent aux cables de scanner ne dépassant pas 3 métres (9.8 pieds) de long en extension maximale:**

**Folgendes trifft zu, wenn das Scannerkabel kürzer als 3 Meter ist:**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

**Notice**

This Class B digital apparatus complies with Canadian ICES-003.

**Remarque**

Cet appareil numérique de classe B est conforme à la norme canadienne NMB-003.

# *Limited Warranty*

Honeywell International Inc. ("HII") warrants its products and optional accessories to be free from defects in materials and workmanship and to conform to HII's published specifications applicable to the products purchased at the time of shipment. This warranty does not cover any HII product which is (i) improperly installed or used; (ii) damaged by accident or negligence, including failure to follow the proper maintenance, service, and cleaning schedule; or (iii) damaged as a result of (A) modification or alteration by the purchaser or other party, (B) excessive voltage or current supplied to or drawn from the interface connections, (C) static electricity or electro-static discharge, (D) operation under conditions beyond the specified operating parameters, or (E) repair or service of the product by anyone other than HII or its authorized representatives.

This warranty shall extend from the time of shipment for the duration published by HII for the product at the time of purchase ("Warranty Period"). Any defective product must be returned (at purchaser's expense) during the Warranty Period to HII factory or authorized service center for inspection. No product will be accepted by HII without a Return Materials Authorization, which may be obtained by contacting HII. In the event that the product is returned to HII or its authorized service center within the Warranty Period and HII determines to its satisfaction that the product is defective due to defects in materials or workmanship, HII, at its sole option, will either repair or replace the product without charge, except for return shipping to HII.

EXCEPT AS MAY BE OTHERWISE PROVIDED BY APPLICABLE LAW, THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER COVENANTS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, ORAL OR WRITTEN, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT.

HII'S RESPONSIBILITY AND PURCHASER'S EXCLUSIVE REMEDY UNDER THIS WARRANTY IS LIMITED TO THE REPAIR OR REPLACEMENT OF THE DEFECTIVE PRODUCT WITH NEW OR REFURBISHED PARTS. IN NO EVENT SHALL HII BE LIABLE FOR INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, AND, IN NO EVENT, SHALL ANY LIABILITY OF HII ARISING IN CONNECTION WITH ANY PRODUCT SOLD HEREUNDER (WHETHER SUCH LIABILITY ARISES FROM A CLAIM BASED ON CONTRACT, WARRANTY, TORT, OR OTHERWISE) EXCEED THE ACTUAL AMOUNT PAID TO HII FOR THE PRODUCT. THESE LIMITATIONS ON LIABILITY SHALL REMAIN IN FULL FORCE AND EFFECT EVEN WHEN HII MAY HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH INJURIES, LOSSES, OR DAMAGES. SOME STATES, PROVINCES, OR COUNTRIES DO NOT ALLOW THE EXCLUSION OR LIMITATIONS OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

All provisions of this Limited Warranty are separate and severable, which means that if any provision is held invalid and unenforceable, such determination shall not affect the validity of enforceability of the other provisions hereof. Use of any peripherals not provided by the manufacturer may result in damage not covered by this warranty. This includes but is not limited to: cables, power supplies, cradles, and docking stations. HII extends these warranties only to the first end-users of the products. These warranties are non-transferable.

The duration of the limited warranty for the MS2421/MS2422/MS2431 is two (2) year(s). The accessories have a 90 day limited warranty from the date of manufacture.

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# Customer Support

## Technical Assistance

If you need assistance installing or troubleshooting your device, please contact us by using one of the methods below:

**Knowledge Base:** www.hsmknowledgebase.com

Our Knowledge Base provides thousands of immediate solutions. If the Knowledge Base cannot help, our Technical Support Portal (see below) provides an easy way to report your problem or ask your question.

**Technical Support Portal:** www.hsmsupportportal.com

The Technical Support Portal not only allows you to report your problem, but it also provides immediate solutions to your technical issues by searching our Knowledge Base. With the Portal, you can submit and track your questions online and send and receive attachments.

**Web form:** www.hsmcontactsupport.com

You can contact our technical support team directly by filling out our online support form. Enter your contact details and the description of the question/problem.

**Telephone:** www.honeywellaidc.com/locations

For our latest contact information, please check our website at the link above.

## Product Service and Repair

Honeywell International Inc. provides service for all of its products through service centers throughout the world. To obtain warranty or non-warranty service, please visit www.honeywellaidc.com and select Support > Contact Service and Repair to see your region's instructions on how to obtain a Return Material Authorization number (RMA #). You should do this prior to returning the product.

**Honeywell Scanning & Mobility**
9680 Old Bailes Road
Fort Mill, SC 29707
www.honeywellaidc.com

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